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WE, THE SPASTICS

A College Graduate Spastic
(From the Speech Clinic of Dr. Martin F. Palmer,
University of Wichita, Kansas)

I have been cheated out of my birthright. According to public opinion I should be enjoying the comforts of a state institution. You see, I have spastic paralysis and, after all, what can you do with spastics other than cart them off some place out of your sight? They cannot learn—heaven forbid! Haven't people been saying that pet phrase for years and years? And, just to prove the point, why, just give most any spastic an intelligence test. Of course, his hands may be so crippled that he cannot do the performance tests, and more than likely he will have defective speech so that you cannot tell whether he passes the language test or not. But what does that matter? Several thousands of years ago the Greeks laid down the maxim of "no speech, no mind," and who are we to dispute the "scientific" findings of a group of comparative barbarians? Anyone can tell just by looking at them that spastics are not bright. And to clinch the matter, everyone knows that people with Little's disease have a damaged brain.

(Of course, the only difference between spastic paralysis and the much publicized infantile paralysis is just a matter of a few inches. Infantile paralysis is caused by a lesion of the spinal cord while spastic paralysis is caused by a lesion of the spinal cord a little further up. Yet spastic paralytics are discarded as irreparable.)

Naturally "new pathways can be detoured around the injured part" but the fact still remains that part of the brain is gone.

Isn't it strange then that I who am a spastic will receive a university degree in a couple of months? There must have been a slip up somewhere, for I completed my preparatory schooling in the required time without the benefit of private schools or tutors. Besides, since coming to college I have been partially self-supporting and I have a full time job awaiting me when I finish school.

If I were the only spastic I knew of who had made this accomplishment, I should put myself up as a brilliant exception. Unfortunately for me this is not the case. I have three college friends who are spastics also, and they are working to help with their expenses. (One graduates next year and two are freshmen.) I also know several

Editor's Note: Your editor asked for this article. He considers it one of the finest we have published. Dr. Palmer was requested to have this case present her story unmodified or retouched by anybody. For the language used and clarity of thought expression in such a patient, of themselves throw considerable light on the subject.

spastic children who are actually bright. A visitor who was dubious about the intelligence of people with Little's disease came to see a ten year old spastic friend of mine while she was having her speech lesson. The instructor was joking with her and treating her as an equal. The poor surprised and confused visitor said, "Why, she's getting the point quicker than I am!"

Well, granting that all spastics are not imbeciles, can they make any physical improvement? I hardly want to commit myself on that point. Of course, I used to have severe neck and face spasms. I used to have a question mark posture. My jaw used to slip practically out of joint. I stuttered. Everything I did, I did tensely and clumsily. Now, after training, the spasms of my neck, face and shoulder occur less and less frequently and never as severely. My jaw seldom juts out any more. My stuttering bothers me very little. Everything I do nowadays I do more easily and rhythmically.

Nine-year-old Vivian has learned to walk and is learning to talk. So is Mildred. Don is learning to use his arm, which was so spastic as to be immobile. Lucy, who could not walk alone before training, is taking up bicycling and swimming. John no longer walks with the lurching, pitching gait he did five months ago. I think that in view of these facts I might say there can be physical improvement.

But is it worth all the time and energy it takes to retrain spastics? Listen, you might as well stand on the shore and ask a drowning man whether he thinks you should put forth the effort to save him. You spend dollar after dollar on music lessons for your youngsters. You spend hour after hour in coaxing and threatening to get them to practice. And *maybe* by the time they are sixteen they can play jitterbug racket. Yet some of you wonder if it is worth the same trouble and expense to make spastics happy and useful human beings.

Is it worth the effort? How would you like to be a spastic for a few minutes? All right, get up from your chair and walk across the room. Wait, not so fast. If you are spastic you may have to try several times—as though you were tied to the chair and had to strain every muscle to get loose. After you are up you will probably have a hard time keeping your balance—like walking a rail blindfolded. When you begin to walk, the floor has a way of going up and down. (Have you ever expected a high step where there wasn't any? You remember that jarring feeling of insecurity?) While you are making your way, laborious step by laborious step, perhaps you drop your handkerchief and want to pick it up. It is as hard to get down as it was to get up, plus the fear of toppling over on your nose. Then you try several times to pick it up—as though some one were teasing you and moved it out of your reach each time you tried. Your head may be pulled to one side so that you have to get into a more contorted position than ever in order to see what you are doing. After you have finally gotten hold of it, you lift it as though it weighed twenty-five pounds instead of the actual fraction of an ounce. Of course, you struggle to get up again. You may fall. All this time the

rest of your body, which ordinarily would not be in use, is working as hard as the parts actually necessary for the task. (Just as the normal person bites his tongue when he is doing a tedious job, only on a much larger scale, much as comparing a mouse with an elephant.)

Suppose you want to say "Oh, dear!" In the first place you may have trouble even getting a sound out because your breathing muscles are spastic and may work and again may not. Your vocal folds may approximate correctly—and again they may not. Your tongue more than likely will miss the point of contact. You may not be able to completely close your mouth. And even if everything should work, they probably will not all work together. So any combination of sounds may result from your effort. No matter what comes out, you will be trying as hard as though you were giving a college yell.

You have eaten pickles so sour that for the life of you, you could not keep from making a grimace. Well, just imagine that instead of not having control of your face for a split second two or three times a year, you never had control of it.

Most of you jump at a sudden noise. Suppose you jumped at the sound of a slightly raised voice in an ordinary conversation or at an unexpected use of a word. Suppose you reacted to the ordinary noises of the day just as a normal person reacts to the explosion of a cannon—someone laughing in the next room, the clatter of static on the radio, the buzz of the telephone, footsteps upstairs. You can see how it would be a little difficult to concentrate under these conditions.

Shall we go a little further in our supposing? As a spastic you will not be free from pain, for, besides, the common every day "ailments," you will suffer from the severe spasms. (Some will feel like those nasty cramps you get in your foot, while others will seem more like electrical shocks.) You may also be at the disadvantage of having eyes which do not always see and ears which do not always hear. You may be unlucky enough to have spastic emotions—emotions which will not be controlled. (Yes, even most of you now have a little difficulty in controlling your temper at times.) Then too, you will probably find it—shall we say inconvenient?—to go through the torture of social situations.

Can't you imagine how it might be a little upsetting to have your whole world go to pieces at the slightest sound? Or a bit trying on your good nature as well as tiring physically to make a dozen attempts at everything you did? (Aren't even normal people a little disturbed when they cannot thread a needle or budge a dresser drawer?) Don't you think you would be more or less baffled if you did not understand why your body simply would not work the way you told it to? Or irritated, to say the least, to be talked down to all the time? Or find it somewhat unpleasant to have strangers stare and ask questions? Or disconcerting to realize that no matter how hard you tried you could not show the people you live with the *real* you?

You normal people might find one advantage in being a spastic paralytic. You would not have to worry about your future. If you were lucky enough to escape the engulfing gates of a state institution

when small, you still probably found the public schools closed to you. Even if you were fortunate to be allowed a formal education you do not have much to worry about. In the present set-up you would not have to go through the wear and tear of making a choice of a career, although your mental ability be average or above. You might be unfortunate in possessing an ambition to do things and succeed in life. You might be one of the unlucky spastics who does brow beat the world of insensible humans into accepting you. More than likely, however, you will drift into a delightful life of dull apathy.

Do you normals still ask, is it worth the effort to give us spastics a sane world in place of our chaotic one? To show us supercharged individuals how to turn off the current? To reveal the intelligent human beings behind our twisting bodies, our contorted faces, and thick mushy speech? To make it possible for us to have our chance at happiness? To change institution material into earning power?

Well, is it?

SPASTIC PARALYSIS FROM THE POINT OF VIEW OF THE SPEECH PATHOLOGIST

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The problem of the "spastic paralytic," or better perhaps, the "central motor and sensory defective," is one which seriously concerns the speech pathologist, since from 65% to 75% of these cases are speech defective, and even though these individuals become physically improved, they are still serious problems from the socio-economic point of view as long as the speech defect remains.

The work is further hampered by a point of view that still seems to persist in some quarters in regard to the intelligence of these cases. This point of view is the result of a heritage dating back to the Greeks, who considered speech a "product of the mind," and a concomitant misunderstanding of brain function, which leads automatically to the conclusion that if the brain is injured in any way, intelligence is inexorably affected. The defective speech becomes, then, simply, an indication of the lack of intelligence caused by the lesion. Smith (1) for example, states, "In the group of cases under consideration, 22% were graded as normal, 16% as morons, 40% as imbeciles, and 22% as idiots." One is struck by the coincidence that the presumption of mental deficiency in these statistics almost exactly parallels the assumed incidence of speech defects in these cases. Smith, however, realized the weakness of his study, for he

proceeds to state later, "We wish to emphasize, however, the need for careful re-examination in which the *actual intelligence quotient plays the least part.* . . . We are not fair to the child, for they are consistently under-graded rather than given too high a score." Doll, Phelps, and Melcher, (2), discussing the birth injured child, state the case as follows: "The physical handicaps which are so serious in these patients greatly circumscribe their motor activity and thereby interfere with ideational expression. Such constant frustrations in the exercise of natural growth functions may result in a thwarting of personality or a distractibility of energy which may, in turn, cause gross misrepresentation of their native powers or capacity for further development."

Lord (3) states, "We must consequently be critical in the practical application of the Stanford Binet Scale. . . . There were some children in our study whose mental age correlated as one would expect with school subjects, but a far greater number showed not only variations in IQ, but also a lack of correlation between mental age and educability *which makes the Binet intelligence rating valueless from the point of view of educational prediction.*" Further, she states, "If the child has a poor perception of form and an inadequate sense of spatial relationships, he may at four years receive a mental age of only two years—whereas, at school entrance, between six and seven years, the same child may gain a mental age of five or six years. . . ." Further, "We are dealing apparently in many instances with a brain of average or even superior endowment which has been selectively damaged."

It is the author's opinion that routine psychometry on these cases is not only fallacious but futile if used to determine the potential ability of the particular case, and indeed may do great harm by labelling a potentially capable citizen as a misfit. If these tests are used simply to show the amount of achievement, and to show the work which must be done with the child, they can be very useful. In a visit to a "State Training School for the Mentally Defective," not long ago, while inspecting the low grade ward, the author noticed a spastic child about sixteen years of age seated in a wheel chair. Across the room from her on benches were the rest of the inmates dressed in blue denim and cared for by higher grade inmates who stood behind each two or three and constantly watched them and took care of them in the perpetual necessities of human life on one of its lowest planes. The author spoke to the child and was rewarded with an intelligent smile and reaction. His curiosity aroused he asked the superintendent if the child was low grade. The superintendent replied that she was not at all in the right ward, but that they had a tray service to this ward, where all inmates had to be fed, and since the child was so badly crippled, it was much easier for them to leave her in the low grade ward and feed her there. So this spastic child, who was admitted on a Binet examination, will spend the rest of her life staring at the ladies in blue denim, because she has the misfortune to be so badly crippled that she cannot talk or feed

herself. It would be interesting from the point of view of the effect of environment on intelligence if one could test this child's reactions, and watch her sink towards the level of her associates. The author fails to see how anything else can happen. The additional remark by the superintendent that the child was a spastic and thus had a damaged brain did not alleviate the situation. An effort was made to have her removed from the institution for remedial care, but her physical difficulties made transportation impossible for the institution on its limited budget. The moral seems obvious, that commitment to custodial institutions of these cases is not only an unethical dodging of responsibility, but is an evasion of all sociological and economic principles. The author feels that no spastic child should be committed until remedial work of all types has been tried, surgical, medical, and educational.

In the author's experience, the only way to bring the problem to a sharp issue is for re-training work with spastics to be attempted. The surest way to convince the skeptic is to allow him to work with a few children. Unfortunately, the customary speech corrective technics are not particularly productive of results in most cases. However, sufficient improvement is usually gained to convert the doubter. The case in question in re-training is, of course, not "muscular" at all, nor is it in reality the correction of bad habits. The end goal of all work with spastics from all points of view, is the increase of inhibition from the cortical areas. The technics to be adopted, then, must depend on this fundamental point of view. All surgical, educative, and other procedures are merely parallel attempts to accomplish the fundamental purpose.

This brief paper is only intended to serve as an introduction to the paper by Miss Hedges. Her case is fairly typical of the experience and outlook of the partially corrected spastic. The author has known many of these people, and has had the happy experience of watching them at all ages struggling successfully to overcome their handicaps. The writer believes that nothing could be more convincing to the Association than Miss Hedges' own statement on the problem. The writer only wishes to add that her experiences are typical, not unusual, and he hopes that the spastic child will receive in the future the attention he deserves.

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(1) **Smith, Groves B.** "Cerebral Accidents of Childhood and Their Relationships to Mental Deficiency." Welfare Magazine, 17: 18–33, Oct., 1926.

(2) **Doll, Phelps,** and **Melcher.** Mental Deficiency Due to Birth Injuries. Macmillan, 1932.

(3) **Lord, Elizabeth Evans.** Children Handicapped by Cerebral Palsy. Commonwealth Fund, 1936.

WRITING, TYPING AND SPEAKING

BRANCO VAN DANTZIG
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In the domain of speech, to take the word in its widest sense, writing, that is to say writing by hand, must be included. Graphology primarily refers to the connection which exists between handwriting and character. What is commonly called graphology was at one time merely a superficial study of handwriting, which by its movements expresses individuality. Now that the police authorities have begun to realize the important part which handwriting may play in the tracing of criminals, judgments based on a merely superficial study can no longer be considered satisfactory. Psychological graphology endeavors to adapt to psychology the conclusions empirically drawn from popular graphology. Its aim is therefore to obtain the greatest possible degree of exactitude when graphological conclusions are drawn and to fix the measurable phenomena experimentally.[1]

For this purpose a light apparatus is required which will express the writer's movements in such curves as to make possible the measurement of the pressure used in writing (force, localization, grouping). To state this in very general terms, pressure used in writing serves as an expression of energy. If pressure during writing remains stable, personal characteristics may be deduced from it within certain limits. Pressure, however, should be considered in connection with other factors of the motion phenomenon such as speed, greater or less fluency and constant or infrequent alternations of movement and rest. A good insight may be obtained into the manner in which individual movements (tempo and rhythm) when writing are expressed, if a combined illustration of the intensity and the distribution of the pressure used in writing, the duration and the fluency in time and spacing is presented.

A device has been produced which affords the possibility of observing the most important physical elements of what is written, such as: 1) pressure and pressure distribution, 2) alternations of movement and rest, over a certain period.

From the curves obtained it is possible to read whether an individual writes quickly or slowly, what force and stability the writing possesses and which elements in writing are accentuated by a stronger pressure; further it is possible to ascertain the extent of the motion units and which duration and grouping cause intervals of rest, how far these, by dividing them up over a certain period, express a definite rhythm for writing motion or whether they impede a primary

[1]Non-measurable phenomena are determined as objectively as possible by comparison and estimation.

effort towards rhythm by constant interruptions of the fluency of the movement.

In 1622 an Italian scholar, Camillo Baldo, wrote a book on graphology; this science then remained dormant for a few centuries till it was revived towards the end of the 19th century by W. Preyer, L. Klages and others. The first scientific investigations are described by G. Meyer in his work: "Die wissenschaftlichen Grundlagen der Graphologie." Although the primary object of the enquiry was to discover a connection between effects and handwriting, such enquiries were also employed in later years for scientific purposes, as for instance appears from a book of Erich Feuchtwanger and Klara Roman-Goldzieher: "Handschriftenuntersuchungen an Hirnverletzten; Veranderungen der Schrift durch umschriebene Hirnfunktionsstorungen." During this collaboration Feuchtwanger carried out the medical examinations, while Roman-Goldzieher made tests with the apparatus designed by her, the "Graphodyn."

In another little book of hers: "Studien zur Schriftentwicklung" containing many remarkable facts, she writes: "The handwriting of stammerers is easily recognizable owing to certain special features. The upstrokes are executed in a trembling, clumsy and uncertain manner. Other irregularities are: interruptions, repetitions, the writing afresh of some letters (not to be confused with corrections), the extension of some elements such as the connecting strokes between the various letters, the interpolation of "supporting" points (unnecessary dots), mutilations of words and embolophrasic parenthetic sentences. In adult stammerers the improvement in writing keeps step with the improvement in talking.

Other investigators also direct attention to the connection between writing and talking. F. Gumpertz wrote a treatise on difficulties in writing: some children who talk faultlessly, show initially in their writing faults which characterized their speech in the period of physiological lalling. The original word-engram hidden under the new one, was conscious to such an extent in the minds of these children, that they were able to read it aloud correctly without mistakes and without even noticing the errors in writing. These abnormalities of writing occur frequently and especially in the feeble-minded; further their writing testifies to the lack of control which characterizes all the movements of feeble-minded persons.

When comparing typing with writing, one might be disposed to imagine that individual characteristics, so clearly revealed by handwriting, will be entirely absent in typescript. For on the typewriter the keys with the letters and numerals, the accents and punctuation marks are all ready to hand. We cannot, as in handwriting, insert flourishes and other ornaments or vary the thickness of up and down strokes. Neither shall we succeed in placing the letters in a certain position or make the lines slant upwards or downwards, a characteristic which might lead a graphologist to diagnose optimism or pessimism, as the case may be in the writer. It may be true that those

accustomed to see many kinds of typescript are able to recognize the letter-types of various makes of typewriters, and there may be experts who can detect if one or two fingers or the ten finger system has been used; but to the layman all typescripts appear the same.

And yet, I have found that stereotyped mistakes are made in typing, which are remarkably reminiscent of speech defects, both accidental and pathological. Let me mention first my own typing errors. If my attention is not distracted either by sounds or by my own thoughts, I make comparatively few mistakes. But still, in some words certain consonants are often interchanged, as for instance in Dutch I type "asl" instead of "als"; "betse" instead of "beste". In both cases the letter "s" comes in the wrong place, the first time too soon, the second time too late, without any special reason so far as the order of the keys is concerned.

These and similar typing errors could be compared with slips of the tongue.

If I am not concentrating fully, I may type the first letter of a word correctly and jumble all the rest in such a manner that all the consonants and vowels are there but not in their right order: "plaats" for instance becomes "patals." This looks more like "cluttering." Another error, as a result of typing too quickly, is "anticipation," a well known phenomenon, especially during the development of speech; a child says "goggie" for "doggie" although it is quite able to pronounce the letter "k" in other words. In my case, a sentence like: "I shall come to-morrow" becomes "I shall mome tomorrow." A similar anticipation occurs in words containing two adjoining identical letters: "voor" then becomes "vvor," "waarde" becomes "wwarde" or "warrde." This "posticipation" I experience very rarely, and others tell me the same. The reason is fairly obvious, because in writing—either by hand or when typing—the sound of the word is realized forward, not backward. On my request, others have let me have their experiences which I gladly reproduce here with their remarks on the subject.

Some ascribe their typing errors to a preference for using the right hand, and when using the ten-finger system, for certain fingers. One mentioned a preference for the left hand, but connects this with his being to some extent left-handed. Some mention the interchange of two vowels which adjoin on the keyboard, as for instance o and i, whereas others interchange e and i on account of their acoustic similarity. Others again interchange keys lying above or under one another on the keyboard. In the Northern provinces of the Netherlands the opinion is held that the typing of "s" for "z" and of "f" for "v" and vice-versa is caused by the incorrect pronunciation of these kindred consonants, owing to dialect. Someone in South-Holland on the other hand thought the interchanging of "s" and "z" to be the result of their great similarity in shape. Some mention the transposition of the two composite parts of a diphthong and write "huot" for "hout." One of the most frequent errors seems to be the

omission of an unaccentuated or weakly accentuated syllable occurring more than once in the same word. As children often write words as they *hear* them, so typists sometimes make similar departures from conventional spelling.

One of my English colleagues, too, mentions the typing errors already mentioned: "plate" instead of "palate," "saty" instead of "stay." I have not seen enough of the typescript of stammerers to venture to draw any conclusions from it. When examining their handwriting I have often been struck by the fact that they divide up words, which should be written in one, into parts and vice-versa. Roman-Goldzieher notices the former in adult stammerers and is of the opinion that this is in agreement with what Fröschels calls the dissimulating stage. Gutzmann Sr. describes a case of the writing of a youth stammerer who had great difficulty with the initial "b" and who also used to repeat this letter more than once when writing. In the large works on speech-therapie very little information is available on the handwriting of those who suffer from speech disorders, while there is nothing at all about the typescript of normal and abnormal speakers.

Finally I would like to say something about failures in the typing of capitals. Everyone who mentions this mistake agrees that the capital in this case appears above the line and is reproduced only faintly or in part. While with most typing errors it can be stated that they are due to mainly visual, or mainly auditive influence, it may be said that in the case of capitals the failure is exclusively of a motor character, except when this failing applies to certain capitals only and not to all alike. Some are of the opinion that they use too little energy when striking the keys. I myself sometimes find that I am making this mistake and presume that there is a lack of synchronization between the finger which strikes the letter key and the finger of the left hand which presses the shift key. The fact that I never make this mistake when starting a sentence, strengthens this opinion. If a capital appears in the middle of a sentence, another sudden demand is made on the collaboration of both hands.

In spoken language there is a deviation which in my opinion is also of an exclusively motor character and which I, therefore, venture to identify to a certain extent with the foregoing. I have in mind the "t" at the end of a word when following other consonants. If one hears "kep" instead of "kept." the speaker will maintain that he did articulate the "t." In most cases this is quite true, but he has only started the articulation and has omitted to finish it. He has, therefore, placed his tongue in the correct place for articulation and, for purposes of observation, has felt it to be there, but this alone did not complete the consonant which is only achieved by removing the tongue once more. As in failure in the case of capitals, so failure of the articulation movement must be ascribed to too cursory an execution.

In these few remarks I hope to have demonstrated that typing belongs just as much to the domain of speech, in the wider sense, as

handwriting does, although the latter naturally provides a far more distinct expression of the inner life. I have never yet seen children type, but if one has the opportunity of watching an adult typing, it is evident that he is uttering the words of the text, whether out loud or not, and that perhaps this is more general than in the case of handwriting. The fact that the spoken text is always in advance of the typing, is an argument in favour of the *anticipation* being quite logical. Bearing in mind the fact that the text of the typescript is, simultaneously or just previously more or less articulated, I venture the opinion that the typescript of stammerers will be recognized above all from untimely interruptions and erroneous combination of words, which in the main make the stammerer what he is. For it robs speech of all rhythm and the chief object of therapy is to combat these defects. To pronounce a fully justified and responsible verdict, it would be necessary to study not only the typescript of hundreds of stammerers, but also of the same number of fluent speakers. In all other cases, however, which I have mentioned, the system employed and all other considerations and circumstances will also have to be taken into account: frequently facts which give the impression of similarity are based on absolutely conflicting causes.

To those interested I recommend a study of the following books not referred to in the text:

Bachmann, F. Ueber congenitale Wortblindheit. Berlin, 1927.

Broek, A. J. P. van den. Over het ontstaan van spraak en schrift, Haarlem, 1934.

Dantzig, Maryn van. Over motorische Spreekvoorstellingen en het Stotteren in verband met voorstellingstypen. Den Haag, 1930.

Eliasberg, W. Ausdruck oder Bewegung im kunstlerischen Schaffen? Wien, 1935.

BOOK REVIEWS

READING AND UNDERSTANDING. By M. A. Bessey and I. P. Coffin. New York: D. Appleton-Century Co., pp. 325, 1936. $1.00.

Follows the recommendations of the National Council of Teachers of English in their idea of "work reading" as set forth in *An Experience Curriculum in English.* Aims to increase vocabulary, Readings selected from fourteen different school subjects. The number of words in the passages is given. Exercises at the end of each passage.

READ AND COMPREHEND. By P. E. Knight and A. E. Traxler. Boston: Little, Brown & Co., pp. 233, 1937.

This is a work book on reading for high school pupils. "Reading is not the simple matter it is often thought to be. Routine reading habits are, of course, basic and usually have been reasonably well mastered in the elementary grades. Beyond the first habits lie many skills to be developed. C. H. V.

THE QUESTION OF OUR ETHICS AND OUR STANDARDS

The editor has received the following among many other letters bearing on a question of most vital import to us all. It is presented our readers just as it was written. For undoubtedly it deserves earnest consideration. So far as your editor is concerned he is inclined to follow the advice until instructed by the Association to the contrary. Furthermore, to eliminate not only unethical self-advertising but also mere subjective impression and unscholarly articles. The letter reads:

"As time goes on members of the medical profession are bound, by the necessities of medical education and medical practice to enter the field of Disorders of Speech. I do not care to elaborate on this matter further at this time, excepting to say that, now that Rush Medical College has been allotted the field of post-graduate medical education exclusively for its future field of work, I am putting this question before the new dean. While I do not know what his reaction may be (nothing can happen about the idea at present) I do not see how the new school can in the long run fail to develop the subject of disorders of voice and speech by a physician as a division of the work of the new highest grade graduate school of medicine. And I do not see how other schools of medicine in the graduate field can fail in the long run to follow suit, especially those in very large cities. Medical practice in this field, especially in disorders of voice, is a crying need in all large cities.

"If I am right, and I feel strongly that I am, the question will sometime arise as to what shall be the national organization in which these physicians shall co-operate. While we cannot tell now what may happen in the future in this respect, we can certainly say even now that, whatever does occur in the future, whether physicians are involved or not, the standing of The American Speech Correction Association is going to depend directly on the scholarship and ethical standing of its membership. Even today, if the American Speech Correction Association is to cater to unscholarly and unethical persons, we may be quite certain that at least some of its members may thereby feel themselves to be driven into more worthwhile associations. The future of the American Speech Correction Association depends on its looking upward and forward rather than backward and downward.

"Has not the unscholarly and the unethical stammering school done the stammerer harm enough already? Has not it served enough already to discredit the honorable scholarly practitioner in the field? Remember that when you deal with a dishonorable worker in the field you cannot know how far he may go to discredit you. How he would like to publish the fact, if it became a fact, that he had been educating those 'high brows' of the American Speech Correction Association how to treat stammering!

"As to the non-scholarly but morally straight worker in the field, you cannot get on common ground with him, because he cannot understand your language. He cannot approach a difficult field intelligently, because he lacks the scientific foundations on which such understanding depends.

"*The Journal of Speech Disorders* represents the American Speech Correction Association. If we lower its standards we injure the reputation of the membership of the Association. The business of the Editor is to hold up those standards. The Editor should avoid publication of articles from the above groups, unless they contain important new matter.

"With best wishes,

Very sincerely yours,

ELMER L. KENYON, M. D."

THE RELATION OF REPETITIONS IN THE SPEECH OF YOUNG CHILDREN TO CERTAIN MEASURES OF LANGUAGE MATURITY AND SITUATIONAL FACTORS: PART I[1]

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The occurrence and interpretation of repetitions in the speech of young children is not an entirely new problem to those interested in the development of language. Fröschels (3) has commented on repetitions, stating that it is not uncommon to find repetitions in infant speech, and that they are hardly pathological, but do lay, he feels, the groundwork for the pathological state if the child is embarrassed by his repetitions. Stinchfield (6) refers to them as slight signs of stuttering, occurring before the child has sufficient control of the speech mechanism to make it entirely automatic. Other statements have been made, such as those of Kirkpatrick (4) who believes that children repeat because they do not have tangible evidence that they have been understood. Interpretations put upon these repetitions obviously differ, and by differing raise the question of interpretative emphasis.

Some few studies have reported the extent of repetition, but usually "repetition" was considered as a self-explanatory term without a clear-cut definition of what was meant. Smith (5) reported the average number of repetitions per word used at each age level from the records of one hour of speech of each of eighty-eight children. Her results were:

Age, Years	Repetitions Divided by Number of Words Used
2	.114
3	.045
4	.022
5	.017

Fisher (2) took nine to twelve hours of stenographic records of the speech of seventy-two preschool children. She studied the amounts of repetition found, defining repetition as "exact repetition

[1]This study was done in the Iowa Child Welfare Research Station and the Speech Clinic, University of Iowa. It was directed by Wendell Johnson.

of the same remark, verbal or nonverbal with no variation in word or sound pattern." She found a correlation of —.73 ± .04 between chronological age and the per cent of exact repetition. She found that a large proportion of the repetition occurred in questions asked of adults, and stated that the unheeding adult puts the child under a repetitive compulsion. The boys were found to repeat more than the girls with 74 chances in 100 of there being a true difference.

None of the studies just mentioned have defined repetition by example, nor have any of them broken repetition into types such as syllable, word, or phrase repetition. There is no mention of normative amounts of repetition for different age-sex groups.

Egland (1) compared "stuttering" and "nonstuttering" children with respect to amounts of repetition through an ingenious puppet technique. This type of study raises the question of the reliability and validity of any criteria which might be used for separating "stutterers" from "nonstutterers."

For some time workers in the field of child psychology and speech pathology have thought that the discrimination of the "stuttering" and the "nonstuttering" child was relatively simple with listening to speech as the basis. Yet it is apparent that there never has been an objective, clear-cut definition of what constituted "stuttering." Unquestionably, every speaking adult and every speaking child at some times and in certain circumstances repeats himself. Many so-called young stutterers, who are not reacting to their speech emotionally merely present "normal" repetitions in their speech, for it is only after "psychological pressure" is put on them that facial grimaces, inhalatory difficulties, peculiar sounds, and "stallers" enter into the speech pattern as they apparently attempt to break or inhibit their repetitions. It would appear that before children are aware that parents or teachers consider their speech abnormal, repetitions are often not associated with other conspicuous types of interruptive speech phenomena. If, at an early age, the distinction between the pathological and the normal is one of quantity rather than quality, no attempts at separating "stutterers" from "nonstutterers" can be made without a measure of the amount of repetition found in the case of the average child. Such a measure would eliminate the careless labeling of a child a "stutterer" by parents and teachers merely on the basis of the presence of repetitions in his speech, thereby laying the stage for all of the unfortunate reactions which are often found associated with the speech of those who are unsure of their ability to speak acceptably.

As a first approach to this whole problem the following questions were formulated:

1. What is the nature of the distribution of repetitions in the speech of young children when repetitions are fractionated into syllable, word, and phrase repetitions?
2. What norms can be established for different age groups of boys and girls through the preschool years when the instances of

repetition and the total number of repetitive elements of syllable, word, and phrase repetition are considered?

3. Do any of the distributions show a measure which serves to segregate in a marked way the extremes from the bulk of the cases for possible purposes of diagnosis of fluency deficiencies?
4. For each age-sex group, what are the findings with regard to the average number of times each repetitive syllable, word, and phrase was repeated? What is the average length of repeated phrases?
5. Are there significant age-sex differences in any of these measures?

In order to attempt an answer to these questions the following research was undertaken.

The subjects used in the study were sixty-two children, thirty-six boys and twenty-six girls enrolled in the Preschool Laboratory of the Iowa Child Welfare Research Station. They ranged in age from twenty-four to sixty-two months, and the range in IQ's was from 105 to 162.

The data for this portion of the study were gathered by recording verbatim the speech of each child for an hour. The hour was broken into two half-hour periods and the records taken within one week of the day of the month corresponding to the birth date. The midpoint of the two days of recording was considered the date on which the data were gathered. All records were made during the free play period in the preschool routine when teacher-domination was at a minmum. The records were taken in a type of speed writing, devised by the experimenter, in order to keep pace with those children who talked very rapidly.

In the analysis, repetitions were considered a bit more broadly than in terms of exact duplications. The following presentation of the definitions and their qualifications will clarify what was meant:

1. A repetition is defined as the utterance of the same syllable, word, or group of words more than once. For example: "I want, I want to go."
2. The addition of "yes" or "no" to the repeated phrase does not vitiate the repetition. For example: "Put it in her wagon. No, put it in her wagon."
3. The addition of "too" or "hey" still preserves the repetition. For example: "Hey, here's some over here. Here's some over here too."
4. There can be repetition within a repetition which counts as a total of two repetitions. For example: "Put it in her wagon. Put it, put it, put it in her wagon."
5. A total response which is repeated at the beginning of the following response counts as a phrase repetition. For example: "You can't. You can't have any."

6. A phrase repetition may occur as part of one response, or involve the repetition of a total response. For example: "What are these things? What are these things?" or "What are these, what are these things?"
7. The calling of an individual's name over and over counts as a repetition. For example: "Mary. Mary. Mary."
8. The absence of the definite or the indefinite article does not vitiate the response as a repetition, because of the difficulty of detecting it in rapid speech. For example: "You sleep in the dog house You sleep in dog house."
9. Two complete responses can be repeated as a group, in which case they are scored as two repetitions. For example: "Oh, look what he's doing. He's putting his feet in the dog house. Oh, look what he's doing. He's putting his feet in the dog house."
10. The insertion of the name does not cancel the repetition. For example: "Let's rock on the rocking horse. Timmy, let's rock on the rocking horse."

The following limitations on repetitions were established:

1. Changes of one word essential to the meaning of the response nullify it as a repetition. For example: "That's all I need. That's all we need."
2. "What" or "hunh" when repeated were not scored as repetitions because their presence may be indicative of the child's inability to hear a remark made to him by another.
3. The insertion of a nonidentical remark between identical remarks cancels the repetition. For example: "We won't go down, will we? Watch. We won't go down, will we?"
4. Sounds made in imitation of motors, gas being put in a car, or water coming out of a hose, etc., were not scored as repetitions, since the child was attempting to imitate a continuous sound. For example: "Errrrrn. Errrrrrrn. Errrrrrn" (a motor).
5. A change of sentence structure nullifies the response. For example: "You can't. You cannot."

Unintelligible repeated syllables were included among the repetitions on the ground that they may have carried meaning to the child if not to the ear of the adult recorder.

Since the study concerned repetitions as a part of communicative speech, repetitions of either meaningful or nonsensical syllables, words, or phrases for the apparent enjoyment of rhythm were eliminated. The elimination was made on the basis of detection of rhythmical form in which the word or group of words repeated presented a chanting quality, a definite recurrence of pitch pattern, a regular cadence or emphasis.

With the concept of repetition determined, an analysis of the speech sample of each child was made in terms of the following twelve measures.

1. The instances of repeated words multiplied by the number of times each was repeated, added, plus the number of instances of syllable repetition, plus the number of words repeated in phrases multiplied by the number of times each was repeated, all divided by the number of words spoken.
2. The sum of the number of instances of syllable repetition was divided by the total number of words spoken.
3. The sum of the instances of word repetition was divided by the total number of words spoken.
4. The sum of the instances of phrase repetition was divided by the total number of words spoken.
5. The number of instances of word repetition plus the number of instances of phrase repetition was divided by the total number of words spoken.
6. The sum of the number of syllable, word, and phrase repetitions was divided by the total number of words spoken.
7. The instances of syllable repetition were multiplied by the number of times each syllable was repeated, added, and divided by the total number of words spoken.
8. The instances of word repetition were multiplied by the number of times each word was repeated, added, and divided by the total number of words spoken.
9. Phrase repetitions were treated by multiplying the number of words in each repetitive phrase by the number of times each was repeated, these values added, and the total divided by the number of words spoken.
10. Measures 8 and 9 were combined (as measures 3 and 4 were combined to give measure 5).
11. The average number of times syllables, words, and phrases were repeated was determined.
12. The average length of repeated phrases was computed.

The analysis yielded the following results:

The distribution of repetitions, scored in terms of the percentage of all words uttered, represented by those words repeated in part, in whole singly, and in whole in phrases, presented a fairly normal distribution. It is assumed that the apparent bimodality of the curve represents a sampling peculiarity, although the possibility of other interpretations is not to be overlooked. (See Figure 1.)

The mean of this distribution was 24.04 per cent and the standard deviation of the distribution 8.97 per cent. This distribution tended to show that repetition is not unique in a select group of children, but is part of the speech pattern of all children, as judged by the

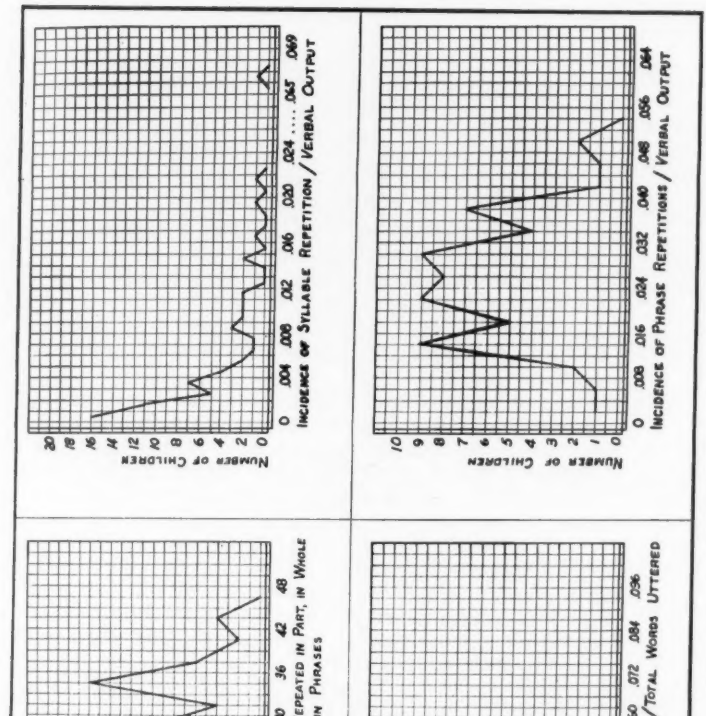
Number of Children
Incidence of Syllable Repetition / Verbal Output
Number of Children
Incidence of Phrase Repetitions / Verbal Output
Number of Children
Percentage of Total Words Repeated in Part, in Whole Singly, or in Whole in Phrases
Number of Children
Incidence of Word Repetition/Total Words Uttered

FIG. 1. Total Repetition and Incidence of Each Type of Repetition.

group here studied. It also shows that the amount of repetition varied from child to child, some repeating relatively less and others relatively more than the bulk of the group. All the children in the group repeated some words. The range of percentages ran from 6.2 per cent to 43.9 per cent of all words spoken. This material would tend to show that a child whose speech is such that approximately one word in four is a repeated word, either in part or in whole in a word or phrase repetition, is not presenting any abnormality in speech, but is talking "normally."

In consideration of the instances of syllable repetition in terms of verbal output a very different picture was presented. (See Figure 1.) The distribution showed extreme skewness to the right. The mean of the distribution was .004. Of the sixty-two children studied, sixteen did not present any syllable repetitions, and one child was 12.4 standard deviations beyond the mean, with 66 repetitions per thousand words. This child was the one child in the group studied who was judged a "stutterer" by parents and teachers alike.

It is interesting to note that the distribution did not extend unbrokenly from the mean to this point, but that for a distance of 8.8 standard deviations there was no child represented. It is unfortunate that there was not a larger group with more so-called "stutterers" in it, so that it might have been determined whether the distribution would have been continuous to this point or whether it would have been distinctly bimodal. The boy who scored 0.21, the highest scoring child on the main portion of the distribution, was considered a "stutterer" by one teacher, whereas several other teachers were concerned about his speech, but had not decided whether or not he "stuttered." (Since the completion of this study, the mother voluntarily brought this child to the Speech Clinic as a "stutterer.") The girl who scored .019, just two less syllable repetitions in a thousand words, had apparently attracted little attention to herself.

There were five children in this group who had been termed "stutterers" the year prior to the one in which this study was made. They scored as follows: 0, .003, .005, .009, .016. These scores would tend to show that either there was no diagnostic value in this scale, or that the children had been erroneously dubbed "stutterers" in the sense that they had never done an unusual amount of repeating, or that they had improved markedly in the intervening year. Although there are not data to substantiate any of these views, it is the writer's opinion that a combination of the last two possibilities accounted for the findings. It is perhaps possible that there was some basis for the concern over the child who scored .016, although it is to be emphasized that the question would have to be settled on the basis of various items of information in addition to this score of .016.

In consideration of the instances of whole word repetitions in terms of verbal output the distribution was found to be skewed to the right. (See Figure 1.) The mean of the distribution was .014, and the range was from 0 to .041. The child who scored .041 was the youngest child in the group studied. This distribution showed that

FIG. 1. Total Repetition and Incidence of Each Type of Repetition.

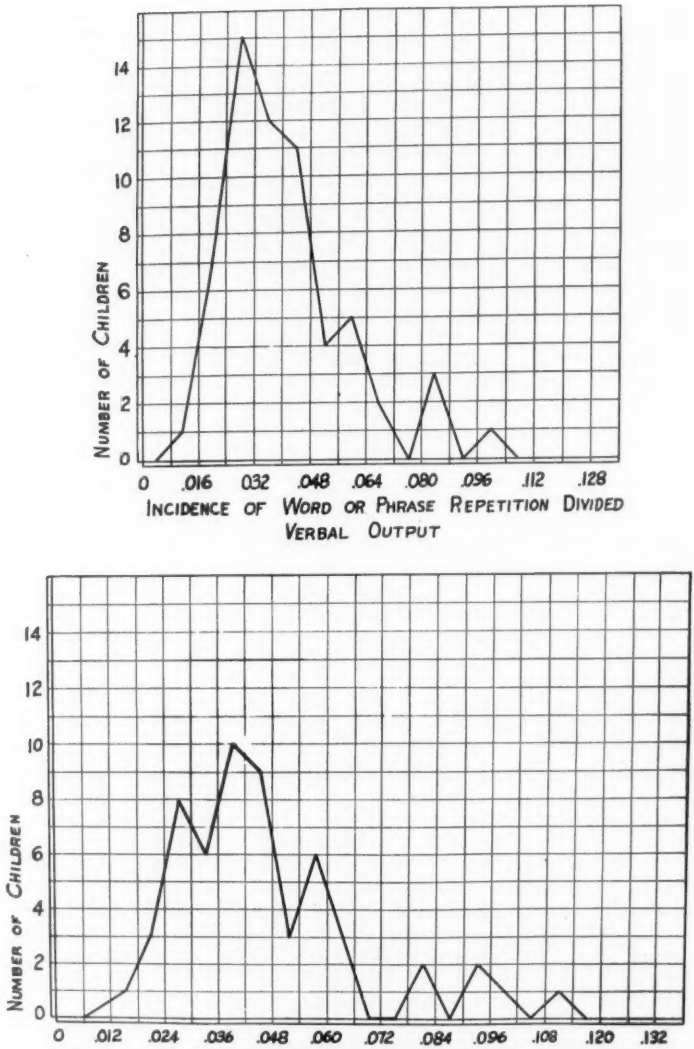

FIG. 2. Incidence of Types of Repetition Grouped.

the average child repeated fourteen words in every thousand words he spoke. Again there was individual variation on this measure with a number of children tending to repeat words more than the average, as was shown by the fact that there was little spread in the number of children repeating less than the mean amount, and considerable variation among those repeating more than the mean amount.

The so-called "stutterer" and the "possible stutterers" did not stand out on the basis of this measure, nor in any of the succeeding measures except those in relation to which they will be mentioned.

With regard to the instances of phrase repetitions in terms of verbal output the distribution was found to be roughly symmetrical and approximately normal. (See Figure 1.) The mean of the distribution was .025, which means that the average number of phrase repetitions in a thousand words was twenty-five. The range was from .010 to .048.

The incidence of word and phrase repetitions totaled and divided by the verbal output presented a distribution that was skewed toward the high values. (See Figure 2.) The mean of the distribution was .041, and the range was .015 to .097. The child who repeated ninety-seven times in a thousand words was a girl of twenty-five months.

The instances of syllable, word, and phrase repetitions combined and divided by the total number of words spoken presented a distribution skewed toward the higher number of repetitions. (See Figure 2.) The mean of the distribution was .045, and the range was from .017 to .113. The child who repeated 113 times in a thousand words was the so-called "stutterer." Although he here received the highest score, it should be noted that he did not appear to deviate so markedly as when syllable repetitions alone were considered. Since he did not show marked deviation in any measures except those dealing with syllable repetition, combination measures which included word or phrase repetitions tended to pull him closer to the balance of the group and to camouflage his deviation in the measure of syllable repetitions.

The distribution of the number of repetitive syllables in terms of verbal output (that is, the instances of syllable repetition, multiplied by the number of times each syllable was repeated, and the sum of these values divided by the number of words spoken) was an exceedingly interesting one. (See Figure 3.) It was markedly skewed to the high scores. Sixteen children presented no syllable repetitions and twenty-eight had less than five in a thousand words. The mean of the distribution was .013, showing that the average child used thirteen syllable repetitions in a thousand words. The range in scores was from zero to .168. The child who used 168 repetitive syllables in one thousand words was the so-called "stutterer." This child was found to be 8.8 standard deviations from the mean of the group. The child next to him, who scored .076, was the boy of forty-nine months whose speech was beginning to be noted by the teachers as dangerously approaching "stuttering." In this measure was

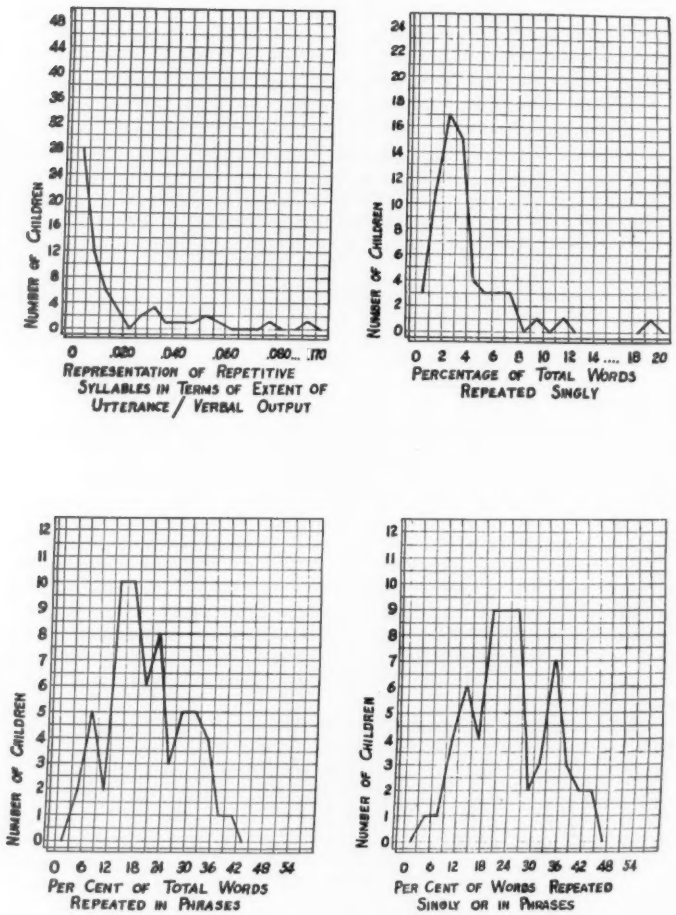
NUMBER OF CHILDREN
0 .020 .040 .060 .080... .170
REPRESENTATION OF REPETITIVE SYLLABLES IN TERMS OF EXTENT OF UTTERANCE / VERBAL OUTPUT
NUMBER OF CHILDREN
0 2 4 6 8 10 12 14.... 18 20
PERCENTAGE OF TOTAL WORDS REPEATED SINGLY
NUMBER OF CHILDREN
0 6 12 18 24 30 36 42 48 54
PER CENT OF TOTAL WORDS REPEATED IN PHRASES
NUMBER OF CHILDREN
0 6 12 18 24 30 36 42 48 54
PER CENT OF WORDS REPEATED SINGLY OR IN PHRASES

FIG. 3.

found the possibility of segregating extremes from the balance of the group.

The distribution of the percentage of words used in a repetitive fashion was also skewed, but not so much as the measure of repetitive syllables. (See Figure 3.) The mean of the distribution was 3.6 per cent, and the range was from zero to 19 per cent. The two who ranked highest with 19 and 11.4 per cent were the two youngest girls studied.

The percentage of words used in repetivite phrases was somewhat skewed, but less than either the use of repetitive syllables or repetitive words. (See Figure 3.) The mean of the distribution was 20.4 per cent and the range was from 3.2 to 40.9 per cent. The child who used 40.9 words in repetitive phrases in one hundred words was the boy of thirty-nine months who rated highest in the first measure, the composite measure. He was not regarded by anyone as a "stutterer."

The distribution of the percentage of words used repetitively in both word and phrase repetitions combined presented a more nearly normal distribution. (See Figure 3.) The mean of this distribution was 24 per cent, and the range was from 3.5 to 43.9 per cent.

In consideration of all of these measures it was found that the two which deal with the instances of syllable repetition and with the number of repetitive syllables used in syllable repetitions, were the best measures for determining the children who deviated markedly from the group. In each of these measures the child who was termed a "stutterer" stands out dramatically from the balance of the group. The percentage of repetitive words out of the total number of words used is probably the next best single measure, but it tended to segregate three children, two of whom were the two youngest girls in the group studied. This would lead to the tentative conclusion that this measure was penalizing the younger children and not segregating the children of all ages who deviated markedly.

The attention of those concerned with the evaluation of repetitions in the speech of young children for the purposes of determining marked deviation from the group should be directed to a study of the child's syllable repetitions.

The distribution of the average number of times repetitive syllables were repeated was a skewed distribution (See Figure 4.) The low values were the range in which the majority of cases fell. The mean of the distribution was 2.25. Sixteen children did not repeat any syllables, so that their scores were zero this measure. There could not be values between zero and two because of the nature of repetitions. By "two" is meant that the syllable was said twice, not repeated twice. Fourteen children had a mean of two. The highest mean score on this measure was 4.39, scored by the boy of forty-three months, a "nonstutterer," who scored highest on the composite measure and on the percentage of words used in repetitive phrases.

The distribution of the mean number of times repetitive words were said did not show a great amount of spread. (See Figure 4.)

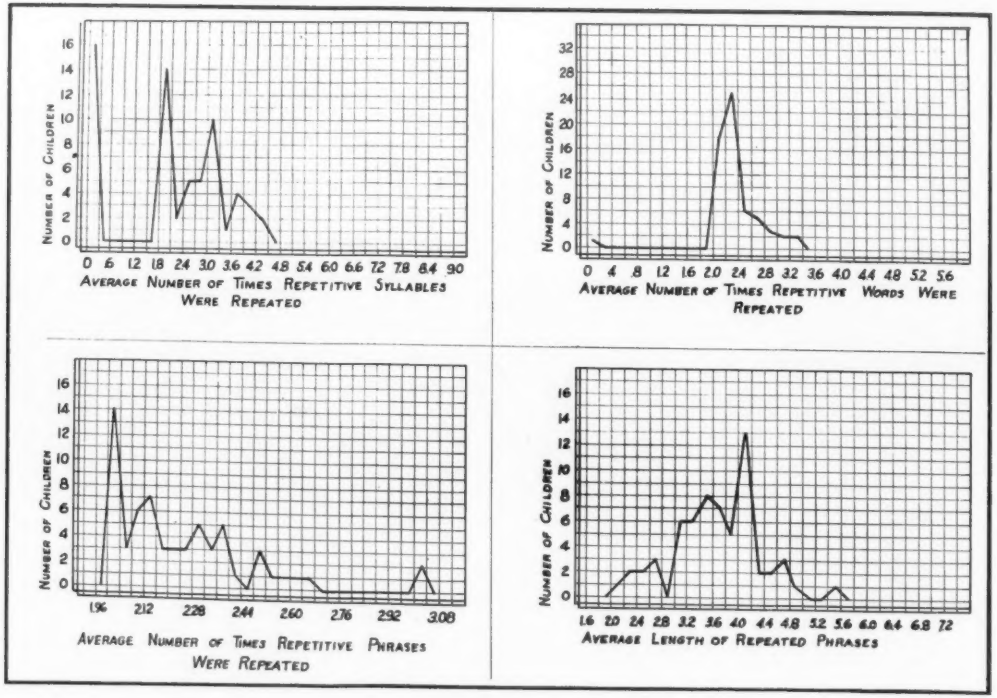
Number of Children
0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90
Average Number of Times Repetitive Syllables Were Repeated
Number of Children
0 4 8 12 16 20 24 28 32 36 40 44 48 52 56
Average Number of Times Repetitive Words Were Repeated
Number of Children
1.96 2.12 2.28 2.44 2.60 2.76 2.92 3.08
Average Number of Times Repetitive Phrases Were Repeated
Number of Children
1.6 2.0 2.4 2.8 3.2 3.6 4.0 4.4 4.8 5.2 5.6 6.0 6.4 6.8 7.2
Average Length of Repeated Phrases

FIG. 4. Average Number of Times Repetitive Elements were Repeated.

There was only one child, a girl of twenty-nine months, who repeated no words. The other children in the group clustered between 2 and 3.3.

The mean number of times each repetitive phrase was said showed more scatter than either of the other two means. (See Figure 4.) The mean of the distribution was 2.25. All the children repeated phrases; the highest score was 3.

The mean length of repeated phrases showed a distribution that approached normalcy. (See Figure 4.). The mean of the distribution was 3.67 words, and the range was from 2.0 to 5.5.

The question of whether those children who ranked high in instances of either syllable, word, or phrase repetition ranked high in either or both of the other two measures is an important one. If the correlations among these three are high, then it can be concluded that any single one is a good measure of repetitions as a whole. The correlation of the instances of syllable repetition with the instances of word repetition was .40 ± .11. The instances of syllable repetition correlated with the instances of phrase repetition was .09 ± .13. The correlation of instances of word repetition with instances of phrase repetition was .34 ± .11.

In correlating the total extent of syllable repetitions with the extent of word repetitions the result was .35 ± .11. The extent of syllable repetitions correlated with the extent of phrase repetitions yielded a coefficient of .03 ± .13. The extent of word repetitions correlated with that of phrase repetitions .11 ± .13.

It is shown from these correlations that the possibility of predicting from one type of repetition what the other two types will be is exceedingly limited. If, then, the measure of either the instance of syllable repetition or the number of repetitive syllables is to be used as the measure for separating extremes from the group, it is not justifiable to substitute for it measures of the extent or instances of either word or phrase repetitions.

Another question which should be answered is whether those children who present the largest number of instances of syllable, word, or phrase repetitions in terms of verbal output are the same children who rank highest in the total amounts of syllable, word, and phrase repetition, respectively, determined in terms of extent.

The correlation of instances of syllable repetition with total number of repetitive syllable elements was .96 ± .01. The correlation of instances of word repetition with the total number of single words used repetitively was .97 ± .008. These two correlations show a high degree of agreement in that the children who had the high incidence of syllable and word repetition also presented a large number of repetitive words and syllables, respectively.

With regard to phrases the findings were somewhat different. The correlation between incidence of phrase repetitions and the length and extent of phrase repetitions was .67 ± .07. This finding shows that there was no great agreement between the number of times a child repeated phrases and the number of times the repetitive phrases were repeated by him.

In addition, the data show that the children in this study used more phrase repetitions than word or syllable repetitions, and more word repetitions than syllable repetitions. This is in keeping with the finding that syllable repetitions are more diagnostic of extreme amounts of repetition, for the more frequent an occurrence, the less unusual it is.

For the purpose of deriving norms the group was divided into three age levels, with the boys separated from the girls. The three age levels were: twenty-four to thirty-five months; thirty-six to forty-nine months; and fifty to sixty months. Medians were derived for each group and the results are given in Table 1.

It will be noted that there are differences in the various measures from age-group to age-group, and that the boys and the girls do not have identical medians. In order to determine what age-sex differences were obtained, critical ratios were computed. From these ratios the following conclusions were derived.

TABLE I

MEDIAN VALUES FOR CHRONOLOGICAL AGE GROUPS, MEASURES OF SYLLABLE, WORD, AND PHRASE REPETITIONS

	AGE MONTHS			
	24 to 35	36 to 49	50 to 60	Total
	GIRLS			
	8	7	11	26
Composite measure	.348	.266	.157	.241
Instances of syllable repetition divided by verbal output	0	.003	.001	.001
Instances of word repetition divided by verbal output	.011	.011	.009	.009
Instances of phrase repetition divided by verbal output	.031	.027	.018	.023
Instances of word and phrase repetitions divided by verbal output	.041	.042	.027	.034
Instances of syllable, word, and phrase repetitions divided by verbal output	.041	.046	.026	.034
Number of repetitive syllables divided by verbal output	0	.0068	.0033	.0033
Number of repetitive words divided by verbal output	1.7 per cent	2.6 per cent	1.9 per cent	2.0 per cent
Number of repetitive words used in repetitive phrases divided by verbal output	28 per cent	22.7 per cent	13.9 per cent	20.5 per cent
Number of repetitive words used in repetitive words and phrases divided by verbal output	34.8 per cent	25.8 per cent	15.3 per cent	23.9 per cent
Mean number of times repetitive syllables were repeated	0	2.67	2.00	2.00
Mean number of times repetitive words were repeated	2.14	2.25	2.25	2.25
Mean number of times repetitive phrases were repeated	2.35	2.20	2.18	2.20
Mean length of repetitive phrases	3.90	3.51	3.75	3.73

TABLE I—(Continued)

	Age, Months			
	24 to 35	36 to 49	50 to 60	Total
	Boys			
	7	13	16	36
Composite measure	.297	.239	.219	.229
Instances of syllable repetition divided by verbal output	.004	.001	.004	.003
Instances of word repetition divided by verbal output	.021	.013	.012	.013
Instances of phrase repetition divided by verbal output	.036	.025	.024	.025
Instances of word and phrase repetitions divided by verbal output	.057	.037	.039	.038
Instances of syllable, word, and phrase repetitions divided by verbal output	.063	.039	.042	.045
Number of repetitive syllables divided by verbal output	.0089	.0056	.0125	.0085
Number of repetitive words divided by verbal output	4.8 per cent	3.0 per cent	2.8 per cent	3.0 per cent
Number of repetitive words used in repetitive phrases divided by verbal output	20.4 per cent	20.6 per cent	17.4 per cent	18.9 per cent
Number of repetitive words used in repetitive words and phrases divided by verbal output	26.7 per cent	23.6 per cent	21.3 per cent	23.2 per cent
Mean number of times repetitive syllables were repeated	2.00	2.00	2.89	2.61
Mean number of times repetitive words were repeated	2.29	2.27	2.43	2.29
Mean number of times repetitive phrases were repeated	2.15	2.14	2.12	2.14
Mean length of repetitive phrases	3.78	4.00	3.52	3.68

With respect to age differences, viewing all of the measures for both boys and girls, the general trend, with the exception of the measures where syllable repetitions alone were considered, was in the direction of a decrease in amount with age. As a rule, however, this trend was completely significant only when the lowest age-group was compared with either of the other older age-groups. These findings indicate that if there are true age differences, they are probably confined to the comparison of the two younger age-groups.

With respect to sex differences, these data showed the most striking differences in the instances of syllable repetition and the extent of syllable repetition. These differences, as a rule, favored the boys (i. e., showed that the boys repeated more). Other measures did not show clear-cut sex differences.

Summary

In a study of one hour of the extemporaneous speech of each of 62 children ranging in age from twenty-four to sixty-two months, it

was found that repetitions, when those involving syllables, words, and phrases were combined, showed a fairly normal distribution with all the children in the group represented. Even though the amount of repetition varied from child to child, it was concluded that repetition is part of the speech pattern of all children. The distribution of syllable repetition showed extreme skewness to the right, and it is unfortunate that there were not more so-called "stutterers" in the group to serve as subjects in the testing of the clinical validity of this finding. Both instances of syllable repetition and the number of repetitive syllables used in syllable repetitions were found to be the best measures for determining those children who deviated markedly from the group.

With respect to the extent of syllable, word, and phrase repetitions, averages are given. Prediction from the extent of one type of repetition to another is exceedingly limited. Those children who had a high incidence of syllable and word repetition also presented a large number of repetitive words and syllables, respectively; but there was no great agreement between the number of times a child repeated phrases and the number of times the repetitive phrases were repeated by him. In order of frequency of occurrence, the types of repetition ranked: phrase, word, syllable.

The children were divided into three age groups and the boys and girls separated. Medians for each group were obtained and are presented in Table I. Although there appears to be a decrease with age in amounts of repetition, it would appear that true differences are confined to a comparison of the younger two age groups. Syllable repetition appears unaffected by age within the limits of the population examined.

No clear-cut sex differences were observable with the exception of measures dealing with syllable repetition. These measures indicated more repetition for boys than for girls.

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SEASON OF BIRTH OF SPEECH DEFECTIVES IN MINNESOTA

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The present study concerns the seasonal variations in the frequency of births of speech defectives in the State of Minnesota as compared with the total births in the same state. The most important previous work on the subject of season of birth is that of Huntington.[1] He shows that the season of birth curve for the general population varies in different geographical regions. Therefore the present study includes only Minnesota speech defectives[2] so that comparison with the general population of the state may validly be made.

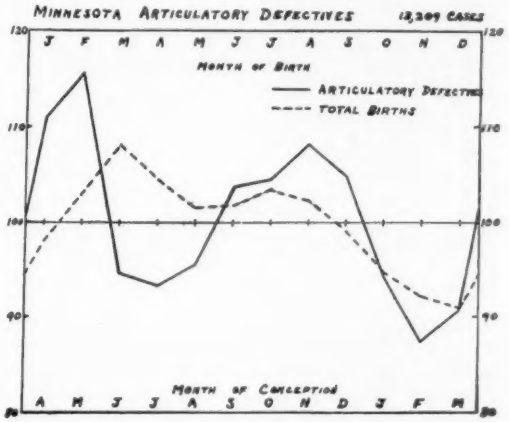

FIGURE 1

Figure 1 shows the curve obtained from the births of 13,209 articulatory defectives, with the curve for the total population

[1]Huntington Ellsworth. *Season of Birth.* New York, John Wiley and Sons, 1938, pp. 473+vi.

[2]Data are included from the following Minnesota cities: Albert Lea, Austin, Chisholm, Coleraine, Duluth, Minneapolis, St. Paul. Grateful acknowledgment is hereby made to speech correction departments of public school systems and to individual speech clinicians in the above cities.

shown for comparison. The term articulatory defectives is understood to include lispers; baby talkers; cases of sound substitution, distortion, or omission; and oral inaccuracy. Foreign accent cases are not included. The curve for the total population is based on U. S. Census statistics for the years 1922–31 inclusive. Over 98% of the subjects in this study were born during this period. The base line labeled 100 in the figure represents the average number of births per day during the entire year, and the average number of births per day during any given month is represented as a percentage of this figure. This is the method of representation followed by Huntington, and it takes into account the varying number of days in the different months.

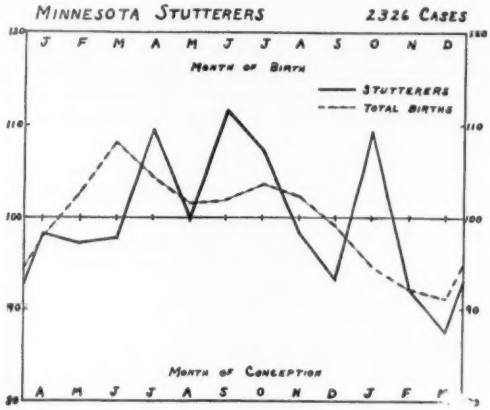

FIGURE 2

There is a reliable difference between the two curves in Figure 1, based on the chi-squared test of reliability. In attempting to formulate a tentative explanation of this difference, several facts may be pointed out. The curve for articulatory cases differs from the general population curve chiefly in the fact that it accentuates the characteristics of the latter. True, the yearly maximum also occurs one month earlier than in the curve for the normal population, whereas the minor maximum is one month later. However, in its broad general characteristics the curve for articulatory cases follows rather closely that for the general population and exaggerates its characteristics. There seems, then, to be a pronounced tendency for conceptions and births of articulatory cases to follow what Huntington terms the basic animal rhythm. Huntington refers to the "excessive births of weak types at the height of the basic

animal rhythm."[3] Are we justified in considering articulatory defectives as a "weak type?"

Carrell made two studies of articulatory defective children, giving them a number of tests of intelligence, school achievement, physical status as measured by anthropometric examinations, auditory acuity, phonetic discrimination, and motor ability. He concludes that "the picture presented by these speech defective children . . . is one of general retardation."[4] If one is willing to interpret this general retardation as being indicative of a biological inferiority, then a possible explanation for the relationship between the curves for articulatory defectives and for the total population suggests itself.

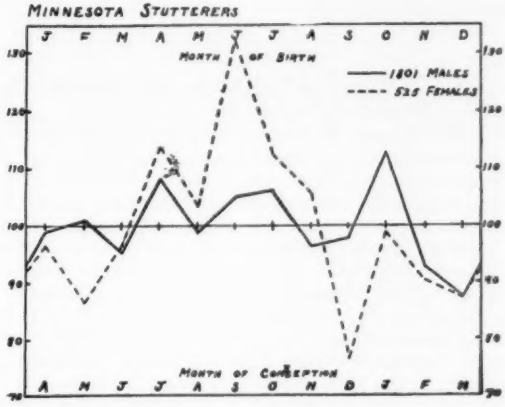

FIGURE 3

Figure 2 presents the curve for season of birth of 2326 Minnesota stutterers. Although this curve differs markedly from that for the total population, the difference is not great enough to be statistically significant. However, certain isolated differences between the two curves are fairly reliable. For instance, there are 97 chances in 100 that the October deviation from the normal is a true difference. Because of the high sex ratio among stutterers a comparison was made of season of birth of male versus female stutterers, and is presented in Figure 3. The difference between these two curves is statistically reliable. The striking drop in the female curve from July to September is of especial interest.

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[3]*Op. cit.*, p. 406.

[4]Carrell, James. "The Etiology of Sound Substitution Defects." *Speech Monog.*, IV, 1937, 17–37.

No such explanation as was suggested for the articulatory cases appears in the case of the stutterers. It is difficult in terms of the present knowledge of this subject to account for the unusual shape of the stutterers' curve with its three maxima, and for the differences between the curves for the two sexes. The need for further study, both of the general subject of season of birth and of the particular question of season of birth of speech defectives, is clearly indicated.

The present authors are accumulating data on season of birth of speech defectives in states other than Minnesota, and are also adding as many cases as possible to the Minnesota number. This report is only preliminary and tentative in nature, and it is hoped that when a larger body of data is available a logical intepretation may be reached in terms of established facts in the fields of physiology, genetics, etc.

PREDICTION AND PREVENTION OF READING DIFFICULTY. Stanger and Donahue. Oxford Univ. Press, New York, 1937, 191 pp. $2.00. Univ. of So. California.

Deals with theory regarding reading disability, tests of reading accomplishment and teaching techniques. The volume is based upon educational experience of the authors in the Ethical Culture School of New York, where it was discovered that many adults lacked reading skill and needed expert training in order to gain ordinary facility. Many third grade teachers also discovered a large number of children coming from second grade, who were unable to read. Building upon Orton and Travis's cerebral dominance theory, they show relationship between speech defects and reading, writing and spelling disability in children. Left-handedness, interference with handedness, injuries to the symbolic or association areas of the brain on the dominant side often produce difficulties in speech, reading and writing, according to the authors. They recommend that reading be deferred in certain cases until the child is ripe for the reading process, as indicated by reading readiness tests. The child should have a mental age of 6½ to 7½ years to be ready for reading, unless precocious. Failures, by non-promotion from first grade, give children the wrong educational start.

Part II describes tests for dominance signs and for visual imagery. Methods are described and many useful suggestions given which may be applied by any resourceful teacher. Tests of auditory efficiency are also suggested. Part III is devoted to teaching procedures. Word building games, rhyming games, nonsense syllables from which words may be made, alphabet practice by means of indexes are discussed. In the concluding chapters the authors suggest that we may even come to determine the inclusion of foreign language study in the child's curriculum, by ascertaining first whether or not he has a language disability in his own tongue, as indicated by diagnostic reading tests. They urge the development of an elastic curriculum generally, suited to the needs of all children.—S. H.

STUDIES IN THE PSYCHOLOGY OF STUTTERING, XIV.

Stuttering Phenomena in Relation to Size and Personnel of Audience[1]

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I. Introduction

The purpose of this study was to investigate certain stuttering phenomena in relation to the size and personnel of the audience. The following specific questions were considered: (1) Does the frequency of stuttering increase with an increase in size of audience? (2) Does the frequency of stuttering change in reading to a single evaluated listener (evaluated by the stutterer as "hard to read to," "easy to read to," or "neutral") as compared to reading to a single unevaluated listener? (3) Is the subject's evaluation of single listeners in terms of *hard*, *neutral* and *easy* consistent with the relative frequencies of stuttering in reading to these listeners? (4) Does the frequency of stuttering coincide closely with the stutterer's expected frequency of stuttering in all situations? (5) Does the expected frequency of stuttering increase with an increase in size of audience? (6) Is the per cent of adaptation, in terms of the per cent of decrease or increase in the frequency of stuttered words (with continued reading), in each situation affected by the size and personnel of the audience? (7) Is there any difference in the subject's evaluation of his reaction to each situation and the audience's evaluation of the subject's reaction to each situation? (8) Does the subject indicate an increase in "tension" or "emotionality" with an increase in size of audience?

This problem was approached in part in a previous study by Steer and Johnson (1), who state, "Briefly, the least stuttering occurred in situations in which there was either a familiar audience (of one person) or no audience at all. The most stuttering occurred in situations in which the audience was unfamiliar, or indefinite (phonograph recording), or relatively large (two to at least eight persons)." The following differences are to be noted between the study by Steer and Johnson and the present one: in the present study (1) the situations varied only with regard to size and personnel of audience; (2) a different prose passage was used for each situation; (3) each subject experienced eight situations (the total number used)

[1]This study was directed by Wendell Johnson at the University of Iowa.

consecutively in one evening; (4) the adaptation of the subject to each situation in terms of decreasing or increasing frequency of stuttering from the beginning to the end of each passage was studied; (5) the audience was held constant in each situation from subject to subject and from situation to situation, i. e., the audience in the second situation was retained as part of the audience in the third and the audience in the third situation was retained as a part of the audience in the fourth, etc.; (6) in each of the last three situations, the single listener was previously evaluated by the stutterer; (7) the specific words stuttered were checked in all situations; (8) the subject checked his own stuttered words in certain situations; (9) the stutterer's expected frequency of stuttering was recorded before each situation; (10) an introspective questionnaire based on, but different from, that used by Steer and Johnson was used; (11) the listeners' evaluations of the subjects reaction to the situation was obtained; (12) thirteen stutterers were used as subjects, whereas in the earlier study ten subjects were used.

II. Procedure

The material used in the present study was taken from the Iowa Oral Reading Test for Stutterers (2). Sections I, II, III, and IV were each divided into two 500-word passages, making a total of eight passages, one for each situation.

Ten male stutterers and three female stutterers, all receiving remedial speech instruction at the University of Iowa, were selected as subjects in this investigation. The males ranged in age from 18 to 32 years, the average being 22; the females ranged in age from 22 to 28 years, the average being 26. The average age of the group as a whole was 24 years.

The listeners were selected primarily on the basis of constant availability. Since it was impossible to maintain one hundred per cent of the audience group of eight for each subject, a substitution list of three persons was employed when necessary. Not more than one substitution was found necessary at any one time. Four members of the audience had worked with stutterers clinically; three had had no experience with them; and one had worked with speech defectives other than stutterers.

The experiment was conducted as follows: first the subject was directed to an empty conference room and given a typewritten copy of the material selected for situation one, and a typewritten card which read: "You will read this passage of 500 words aloud to yourself. On what per cent of the words do you expect to stutter?" He was instructed to read the passage in his own best speech, without any attempt to avoid, fake or superimpose any given rhythm, and he was asked to check his stuttered words. The experimenter then left the room, closed the door and checked the stuttered words in the adjoining room over a concealed microphone. In situation two, the subject was given the material to be read, a card stating the

number of listeners—one, the experimenter—in the audience and requiring an expectancy estimate, and a mimeographed copy of the introspective questionnaire[2] to be checked at the close of the reading. The experimenter checked the stuttered words and filled out an audience questionnaire at the close of the performance. The same procedure was followed in situation three, in which there were two listeners, i.e., the subject was given his new material, his card stating the number of listeners and on which he recorded his estimated expectancy, and an introspective questionnaire. The experimenter checked the stuttered words, and each member of the audience filled out an audience questionnaire after the reading. In situation four there were four listeners, and the procedure continued as before. In situation five, there were eight listeners, and the procedure remained the same. For the sixth reading, the subject read to a single listener whom he had previously evaluated as a person "hard" to read to, and the procedure followed was that used for situation one; he checked his own stuttered words while reading and the experimenter checked the stuttered words in the next room by means of a concealed microphone. Listener and subject filled out their respective questionnaires independently after the reading. Situations seven and eight followed this pattern exactly. In situation seven, the single listener had been evaluated previously by the subject as "neutral"—not especially hard, nor especially easy, to read to. In situation eight, the listener had been evaluated by the subject as "easy" to read to.

Throughout the experiment the listeners remained passive. They had no conversation or contact with the subject. Their only purpose was to impress the subject with regard to their numerical value.

The reliability of marking stuttered words was checked for the experimenter by playing four phonograph records of stutterers' speech on four different days. Stuttered words were marked on duplicate copies of the passages reproduced on the phonograph records. The number of stuttered words recorded each time the records were played was compared with the number recorded at each of the other times they were played. The average per cent agreement thus obtained by the experimenter was 96.

III. Results

(1) As shown in Table I, frequency of stuttering tended to increase with increase in size of audience (observed when the data from all the stutterers are pooled and individual differences are ignored). In terms of individual subjects, the greatest frequency of stuttering was shown by six when reading to eight listeners, by six when reading to four listeners, and by one when reading to two

[2]The introspective questionnaire filled in by the subject and the one filled in by each member of the audience immediately after each situation are to be found in the appendix of the manuscript copy of this report on file in the library of the University of Iowa.

TABLE I

THE PER CENT OF WORDS STUTTERED OUT OF THE TOTAL NUMBER OF WORDS READ IN EACH SITUATION; 500 WORDS READ BY EACH SUBJECT IN EACH SITUATION.

No. of Persons in Audience	SUBJECTS													
	A	B	C	D	E	F	G	H	I	J	K	L	M	Total
0.....	3.6	0	5.6	.4	4.	.6	0	1.4	5.	.2	2.	2.2	11.8	2.8
1.....	12.8	.6	15.2	46.	13.	1.	.2	3.	14.6	.8	4.81	3.6	15.6	9.5
2.....	20.6	.8	18.2	51.2	51.6	11.	3.	5.2	27.	.8	6.4	2.	10.	13.
4.....	28.4	2.2	25.	66.6	20.6	11.	3.	5.8	21.2	1.2	6.4	.8	14.4	16.
8.....	39.8	3.	29.6	73.6	25.2	1.2	1.4	3.8	18.4	.8	4.	6.6	10.2	16.7
Hard*.....	27.4	1.2	22.	67.	18.	3.6	.4	2.4	6.8	1.8	6.4	2.6	10.8	13.
Neutral.....	25.4	1.4	13.	18.8	12.	1.2	.2	1.	9.4	1.	2.6	3.4	9.2	7.6
Easy.....	27.	.4	12.	49.6	8.	.8	0	3.6	4.	1.2	3.4	3.	8.4	9.2

*One listener had been previously evaluated by the subject as "hard" to read to, one as "easy," and one as "neutral"—i. e., neither "hard" nor "easy" to read to.

listeners. Eleven subjects stuttered least in reading alone. Only two subjects did not stutter when reading alone, and one actually stuttered more frequently when reading alone than when reading to eight listeners. Other individual exceptions to the group tendency are made clear in the Table. Critical ratios are given in Table II.

TABLE II

CRITICAL RATIOS (D/σ DIFF.) BASED ON TOTAL PER CENTS SHOWN IN TABLE I

No. of Persons in Audience	Critical Ratio
0 vs. 1	13.7
1 vs. 2	6.3
2 vs. 4	4.8
4 vs. 8	1.08
Hard vs. Neutral	10.2
Hard vs. Easy	6.9
Neutral vs. Easy	3.2
*Experimenter vs. Hard	22.2
Experimenter vs. Neutral	12.3
Experimenter vs. Easy	15.5

*The experimenter is the single unevaluated listener to whom the subject read in the second situation.

(2) From Table III we see that the subject's evaluation of a single listener in terms of "hard" and "easy" is consistent with the relative frequency of stuttering to a dependable degree, while any intermediary evaluation is less consistent. Ninety-two per cent more of the evaluations labeleld "hard" were associated with a higher fre-

TABLE III

THE NUMBER OF TIMES THE SUBJECT'S EVALUATION OF THE AUDIENCE AS "HARD," "NEUTRAL," OR "EASY," CORRESPONDED TO THE RELATIVE FREQUENCY OF STUTTERING

	SUBJECTS													
	A	B	C	D	E	F	G	H	I	J	K	L	M	Total
Hard vs. Neutral	x		x	x	x	x	x	x		x	x		x	10
Hard vs. Easy	x	x	x	x	x	x	x		x	x	x	x	x	12
Neutral vs. Easy		x	x		x	x	x		x				x	7

quency of stuttering than the evaluations labelled "easy"; 77 per cent more of the evaluations labelled "hard" were associated with a higher frequency of stuttering than the evaluations labelled "neutral," while only 54 per cent more of the evaluations labelled "neutral" were associated with a higher frequency of stuttering than the evaluations labelled "easy."

TABLE IV

THE PER CENT OF WORDS (500 IN EACH SITUATION) ON WHICH STUTTERING WAS EXPECTED AND THE PER CENT OF WORDS (500 IN EACH SITUATION) STUTTERED

Persons in Audience		A	B	C	D	E	F	G	H	I	J	K	L	M	Total†	D/σ Diff.
0.	*E	1.	0	5.	.4	10.	1.	0	5.	2.	6.	0	3.	10.	3.3	
	S	3.6	0	5.6	.4	4.	.6	0	1.4	5.	.2	2.	2.2	11.8	2.8	1.4
1.	E	20.	0	10.	50.	25.	0	0	7.	5.	1.	1.6	4.	15.	10.7	
	S	12.8	.6	15.2	46.	13.	1.	.2	3.	14.6	.8	4.8	3.6	15.6	9.5	1.6
2.	E	20.	0	17.6	50.	25.	0	1.	8.	10.	1.	3.6	4.	15.	12.	
	S	20.6	.8	18.2	51.2	15.6	11.	3.	5.2	27.	.8	6.4	2.	10.	13.	2.21
4.	E	40.	0	45.	50.	30.	4.	2.	10.	20.	1.	9.	2.	15.	17.5	
	S	28.4	2.2	25.	66.6	20.6	11.	3.	5.8	21.2	1.2	6.4	.8	14.4	16.	1.7
8.	E	60.	0	65.	50.	30.	1.	2.4	10.	25.	0	0	3.	15.	20.8	
	S	39.8	3.	29.6	73.6	25.2	1.2	1.4	3.8	18.4	.8	4.	6.6	10.2	16.7	5.9
Hard	*E	40.	0	50.	50.	30.	1.	2.	5.	10.	0	3.6	3.	15.	15.3	
	S	27.4	1.2	22.	67.	18.	3.6	.4	2.4	6.8	1.8	6.4	2.6	10.8	13.	3.9
Neutral.	E	40.	0	15.	0	35.	0	0	5.	10.	0	2.6	2.0	15.	9.3	
	S	25.4	1.4	13.	18.8	12.	1.2	.2	1.	9.4	1.	2.6	3.4	9.2	7.6	3.5
Easy.	E	40.	0	10.	50.	35.	0	0	2.	10.	0	3.6	3.	15.	13.	
	S	27.	.4	12.	49.6	8.	.8	0	2.6	4.	1.2	3.4	2.	8.4	9.2	6.9

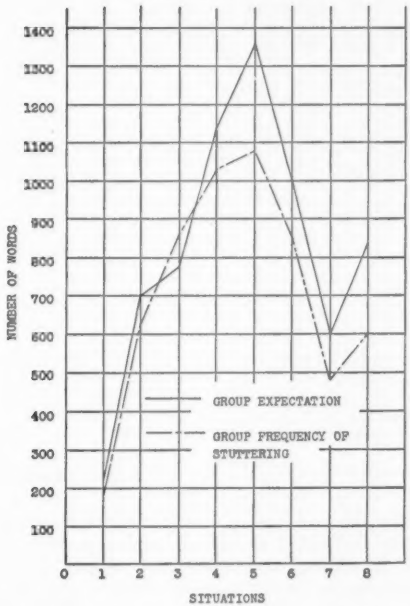
*"E" represents the per cent of words on which stuttering was expected and "S" represents the per cent of words stuttered in each situation.

†"Total" represents the per cent of words on which the group as a whole expected to stutter and the per cent of words on which they stuttered in each situation.

(3) In any situation a subject can expect to stutter more than he does, or can stutter more than he expects to. As shown in Table IV, the subjects as a group stuttered less than they expected to in seven situations and more than they expected to in one situation (when reading to an audience of two people). Four of the differences were statistically significant, being larger than three times their respective standard errors. Out of a possible 104 comparisons between the

FIGURE 1.

EXPECTATION IN RELATION TO FREQUENCY OF STUTTERING



number of expectation words and the number of stuttered words, only five indicate perfect agreement, 44 indicate less expectancy than stuttering, and 55 indicate the reverse.

The graphical representation of the difference between expectancy and frequency (Figure 1) for the group shows the greatest discrepancy in estimating situations five (eight listeners) and eight ("easy" listeners). The closest approximation of expectancy and frequency is shown in situations one and two, in which the subject read to himself and to the experimenter.

(4) Figure 1 also shows that there is an increase in expectancy with an increase in the size of audience for the group as a whole. Seven subjects increased their expectancy of stuttering consistently with increase in the size of audience; one subject decreased his expectancy insofar as he showed any change with an increase in the size of audience; three subjects did not vary their expectancy, and two were inconsistent. A statistical evaluation of differences in expectancy is given in Table V.

TABLE V

PER CENTS OF WORDS ON WHICH STUTTERING WAS EXPECTED BY THE 13 SUBJECTS AS A GROUP, AND CRITICAL RATIOS OF DIFFERENCES BETWEEN DESIGNATED SITUATIONS.

No. of Persons in Audience	Per Cents Expectation	D/σ Diff.
0	3.3	
		16.9
1*	10.7	
		2.3
2	12.0	
		8.8
4	17.5	
		4.8
8	20.8	
Hard	15.3	
		10.5
Neutral	9.3	
		6.7
Easy	13.0	

Additional critical ratios:

*Experimenter vs. Hard	24.5
Experimenter vs. Neutral	14.3
Experimenter vs. Easy	20.6
Hard vs. Easy	3.9

*The experimenter is the unevaluated one-person audience.

(5) As a group, the subjects showed a negative per cent of adaptation in five out of the eight situations. This means that they actually stuttered more in reading the final 100 words of the passage than they did on the average when reading the four preceding 100 word segments of the passage. The greatest amount of adaptation, 29 per cent, was found in situation seven (when the subject read to a listener evaluated as "neutral") and the least amount of adaptation, —10.7 per cent, was found in situation six (when the subject read to a listener evaluated as "hard").

(6) The introspective questionnaire filled out by the subject following each situation covered the following six points: degree of emotionality experienced in the situation; degree of desire to talk without stuttering; degree of embarrassment; degree of audience embarrassment (as judged by the subject); degree of audience

approval or disapproval of subject (as judged by the subject); degree of muscular tension experienced in the situation. Members of the audience made ratings covering the same points from their point of view. In judging degree of muscular tension, four scale steps were used; in judging each of the other five points, three scale steps were used. It was possible for each rating by the subject to be

TABLE VI

AFTER EACH SITUATION THE SUBJECT AND EACH LISTENER MADE RATINGS OF THE SUBJECT'S DEGREE OF NEGATIVE EVALUATION OF THE SITUATION, USING SIX DIFFERENT RATING SCALES COVERING SIX ASPECTS OF THE SUBJECT'S REACTION. THIS TABLE PRESENTS FOR EACH SITUATION THE PER CENT OF LISTENER RATINGS THAT WERE IDENTICAL WITH THE SUBJECT'S OWN RATINGS, THE PER CENT THAT WERE HIGHER AND THE PER CENT THAT WERE LOWER.

No. of Persons in Audience		Per Cent of Total
	Listeners' ratings identical with subject's own ratings	67
1.	Listeners' ratings higher than subject's own ratings	15
	Listeners' ratings lower than subject's own ratings	18
	Same	53
2.	Listeners' higher	23
	Listeners' lower	24
	Same	52
4.	Listeners' higher	24
	Listeners' lower	24
	Same	53
8.	Listeners' higher	25
	Listeners' lower	22
	Same	54
Hard.	Aud. higher	33
	Aud. lower	13
	Same	55
Neutral.	Aud. higher	24
	Aud. lower	21
	Same	64
Easy.	Aud. higher	18
	Aud. lower	18

higher or lower or the same as the corresponding rating made by each listener. In Table VI, data are given which show that on the whole the listeners' ratings agreed fairly well with the subjects' ratings. When there were differences, the audience ratings were lower about as often as they were higher than the subjects' ratings. Somewhat of an exception holds with regard to the "hard" listeners, who tended to judge the subjects' reaction as being more emotional,

etc., than the subjects themselves judged it to be. Table VII indicates that the subjects' own ratings tended either not to change or else to increase in value with increase in size of audience. It is to be noted, however, that the ratings remain practically the same as between an audience of four and one of eight listeners.

TABLE VII

PER CENT OF SUBJECTS' RATINGS SHOWING INCREASE, DECREASE AND NO CHANGE IN DEGREE OF NEGATIVE EVALUATION OF THE SITUATION OCCASIONED BY CHANGE IN SIZE OF AUDIENCE

Audience Comparisons	*	†	‡
	%	%	%
Single unevaluated listener vs. an audience of two persons...	21	71	8
Audience of two persons vs. an audience of four persons.....	23	64	13
Audience of four persons vs. an audience of eight persons....	13	71	16
Single unevaluated listener vs. an audience of eight persons..	32	58	10

*Indicates an increase in negative evaluation with an increase in size of audience.

†Indicates no change in evaluation with an increase in size of audience.

‡Indicates a decrease in negative evaluation with an increase in size of audience.

IV. Summary and Conclusion

Thirteen adult stutterers each read 500 words in each of eight situations, using a different but essentially equivalent passage in each one.

Each stutterer read (1) while alone (a concealed microphone enabled the experimenter to hear the reading); (2) to the experimenter; (3) to two persons; (4) to four persons; (5) to eight persons; (6) to one listener previously evaluated by the subject as "easy" to read to; (7) to one listener previously evaluated as "neutral" to read to; (8) to one listener previously evaluated as "hard" to read to. In the last three situations a concealed microphone enabled the experimenter also to hear the reading.

The experimenter checked the stuttered words in each reading. The observational reliability of the experimenter was .96, as determined by the method described earlier. In each, except the first situation, both the subject and the listeners filled out a questionnaire designed to indicate how they evaluated certain aspects of the stutterer's reactions. Before each reading, the subject estimated the number of words he expected to stutter.

The main results of this study are: (1) the group as a whole showed a significant increase in stuttering frequency with increase in size of audience in situations ranging from reading aloud alone to reading to four persons. The subjects did not differentiate overtly in terms of frequency of stuttering between four and eight listeners. (2) The group as a whole showed a significant increase in per cent of words on which stuttering was expected with increase in size of

audience, although as between an audience of one person and one of two persons the increase in expectancy was a bit short of statistical significance (C. R., 2.3). (3) The group as a whole expected to stutter more frequently than they did in seven situations (in four situations the differences were statistically significant), and they stuttered more than they expected to in one situation (audience of two listeners). (4) The subjects' rating-scale judgments of their own reactions of "emotionality," "strain," etc., agreed generally with corresponding judgments made by the listeners. The scale values of these judgments tended to rise with increase in size of audience, with the exception that there was little difference in this respect between four and eight listeners. A single listener evaluated as "hard to read to" occasioned more stuttering than one evaluated as "easy to read to."

Through experimental production of variation in frequency of stuttering, one may expect to discover factors which are involved in the precipitation, aggravation and alleviation of the disorder. It is reasonable, within limits, to assume that whatever acts to increase the frequency of stuttering may bring about the condition in the first place. Likewise, it may be that whatever tends to decrease stuttering frequency is indicative of significant remedial measures. The findings of the present study, taken alone, do not justify an elaborate theoretical discussion. It is pertinent to point out, however, that in general the present findings agree with those of the previous studies of the psychology of stuttering printed in this series. The agreement lies in this, that these findings, taken altogether, imply very strongly that even extremely large variations in stuttering frequency can be accounted for in large measure on psychological, or semantic, or evaluational grounds. The stutterer's assumptions regarding the "difficulty" of a situation, a particular audience, a word, a speech sound, a "type of performance," etc., appear to be significantly related to the frequency with which he stutters in the given situation, etc. Figure 1 in the present study may be regarded as one rather striking example of this. How the stutterer formulates his assumptions is another question, one on which we should expect further crucial research to be done. Having formulated them, however, he seems to "project" them on to the situation confronting him, thus reacting not in terms of actualities but in terms of his assumptions or inferences concerning the actualities. Having inferred that a given speech sound or situation is "difficult," he appears to act as if it were. This point of view is suggestive of an interpretation of the findings of the present study. An elaboration of it would necessitate detailed reference to previous work and would expand the present report to an inappropriate extent.

BIBLIOGRAPHY

Johnson, W. and **Brown, S. F.** Stuttering in relation to various speech sounds. *Q. J. Speech*, 1935, 481–496.

Steer, M. D. and **Johnson, W.** An objective study of the relationship between psychological factors and the severity of stuttering. *J. of Abn. and Soc. Psych.*, XXXI, 1936, 36–46.

AMERICAN SPEECH CORRECTION ASSOCIATION ANNUAL CONVENTION

To the American Speech Correction Association:

On the pages which follow, the Program Committee of the American Speech Correction Association presents its tentative program for the meeting of the Association to be held on December 27th, 28th and 29th at Hotel Stevens in Chicago. The meeting of the National Association of Teachers of Speech will be held concurrently and at the same hotel.

Separate convention registration fees are required for admission to meetings of both Associations. Our meetings are open to everybody. But unlike past years our convention fee is paid only at our desk and not to the N. A. T. S.

The formal call for papers sent out by the Committee brought an unprecedented number of responses. With the abstracts at its disposal the Committee made a very earnest effort to provide a balanced program of the highest possible quality, to assure an audience for the largest number of deserving papers and addresses and to reduce as far as possible over-lapping of content.

Its criteria for the acceptance of papers for the program were:

Adequacy and clarity of the abstract submitted.
Pertinency and value of the contents of the paper in terms of the interests of the entire Association.
Its adjustability to imperative time limitations.
Equitable distribution of opportunity among individuals, institutions, geographic areas and well-defined special interests.

The Program Committee is attempting to accomplish something in which the membership of the Association is in completest sympathy, but in which it must *also* have completest co-operation: It has so organized the program, and instructed its chairmen and speakers that *all Section meetings will begin on time regardless of the number of persons present and every speaker will be held to his time limits.*

The author is required to leave his paper on the stand with the chairman as reading is completed.

THE PROGRAM COMMITTEE.
DELYTE W. MORRIS,
CLARENCE T. SIMON,
H. KOEPP-BAKER, *Chairman.*

See Back Cover Page for Announcements of Reduced Railroad Fares and Hotel Accommodations.

(All Section Meetings will Begin on Time)

PROGRAM OF THE AMERICAN SPEECH CORRECTION ASSOCIATION

WEDNESDAY MORNING, DECEMBER 27
9:00 O'CLOCK

Opening Joint-Session with the National Association of Teachers of Speech

PRESIDENT SARA STINCHFIELD-HAWK represents the American Speech Correction Association

THE PRESIDENT'S ADDRESS:
"Speech Re-Education and Social Change"

WEDNESDAY MORNING, DECEMBER 27
11:00 O'CLOCK

Chairman—WENDELL JOHNSON
The Speech Clinic, University of Iowa

11:00 A. M. "General Semantics".....B. CONGDON
Psychiatrist, University of Chicago

11:30 A. M. "A Quantitative Study of Meaning with Special Reference to Stuttering".....CURTIS E. TUTHILL
Director of Speech Clinic, Temple University

11:40 A. M. "General Semantics Applied to the Problem of Stuttering".....MARY MANN
The Speech Clinic, University of Iowa

11:50 A. M. Forum

WEDNESDAY AFTERNOON, DECEMBER 27
1:30 O'CLOCK

Chairman—DELYTE W. MORRIS
Director of Speech and Reading Clinic,
Indiana State Teachers College

1:30 P. M. "Brief History of Speech Correction Program in the Public Schools of California,"
MABEL FARRINGTON GIFFORD
Chief, Bureau of Correction of Speech Defects and Disorders, California State Department of Education

1:45 P. M. "Speech Rehabilitation in the Rural Schools of Waukesha County, Wisconsin"J. ADELBERT YOUNG
Director of Public School Speech Clinic, Oconomowoc, Wisconsin

2:00 P. M. "The Iowa-W.P.A. Remedial Education Survey,"
C. ESCO OBERMANN
Speech and Psychological Clinic, University of Iowa

2:15 P. M. "Speech Correction in American Education,"
GEORGE A. KOPP
Director of Speech Laboratories, Teachers College, Columbia University

2:30 P. M. Forum

2:45 P. M. "Pathological Disturbances of Voice,"
G. OSCAR RUSSELL
Director of Speech Clinic, Ohio State University

3:00 P. M. "Surgical Approaches to the Problem of Bilateral Recurrent Nerve Paralysis".....C. R. STROTHER
Director of Psychological and Speech Clinic, University of Iowa

3:15 P. M. Business Meeting—(For the Membership only)

7:00 P. M. Annual Dinner of the American Speech Correction Association

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THURSDAY MORNING, DECEMBER 28
9:30 O'CLOCK

Chairman—HAROLD WESTLAKE
Speech Clinic, The Pennsylvania State College

9:30 A. M. "A Quantitative Study of the Specific Phenomena Observed in Stuttering".....HELEN BARR
Director of Better Speech Center, Stevens College, Columbia, Missouri

9:40 A. M. "A Study of the Onset and Early Developments of Stuttering".....WENDELL JOHNSON
Speech Clinic, University of Iowa

9:55 A. M. "The Relation Between Repetitions in the Speech of Young Children and Certain Measures of Language Maturity and Situational Factors,"
DOROTHY M. DAVIS
Assistant Director of Speech and Reading Clinic, Indiana State Teachers College

10:05 A. M. "The Relation of Tremors to Perpetuation and Release from the Stuttering Block," C. VAN RIPER
Director of the Speech Clinic, Western State Teachers College, Kalamazoo, Michigan

10:20 A. M. "A Study of the Relationship Between the Complexity of the Oral Reading Situation and the Severity of Stuttering".....EUGENE F. HAHN
Director of Speech Clinic, Wayne University, Detroit, Michigan

10:35 A. M. "Is Stuttering Primarily a Speech Disorder?"
ERWIN O. KRAUSZ
Chicago, Illinois

10:50 A. M. Forum—(15 minutes)

11:05 A. M. "A Critique of the Rationale of Tests of Hearing,"
ROBERT W. WEST
Department of Speech, University of Wisconsin

11:20 to 11:40 A. M. "Demonstration of Methods of Group Audiometry".....BONNIE K. KISER

THURSDAY AFTERNOON, DECEMBER 28

1:30 O'CLOCK

Chairman—MARGARET HALL
Speech Pathologist, Public Schools,
Chicago, Illinois

1:30 P. M. "The Treatment of Organic Speech Disorders by the Moto-Kinaesthetic Method (Motion Pictures),"
SARA STINCHFIELD-HAWK
Research Psychologist, Hill-Young School of Speech, University of Southern California

1:45 P. M. "The Moto-Kinaesthetic Method Applied to Aphasics".....PAUL L. PFAFF
San Diego State College

1:55 P. M. "The Pedagogical Significance of the Kinaesthetic Method in Speech Therapy"..EDWARD LEE TRAVIS
Director of Psychological Clinic,
University of Southern California

2:05 P. M. "Demonstration of the Moto-Kinaesthetic Method,"
HILL YOUNG
Principal, Hill-Young School of Speech,
Los Angeles, California

2:35 P. M. Forum

2:50 P. M. "The Developmental Schedule as a Clinical Instrument".....ELIZABETH D. MCDOWELL

3:05 P. M. "Emergent Specificity in the Child as Affected by Interference with the Developmental Processes, with Especial Reference to Speech Deviations and Mental Deficiency".....MARY MEADER
University of Michigan

3:20 P. M. "Season of Birth of Speech Defectives,"
SPENCER F. BROWN
Assistant Director of the Speech Clinic,
University of Minnesota

3:35 P. M. Business Meeting—(For the Membership only)

FRIDAY MORNING, DECEMBER 29

9:30 O'CLOCK

Chairman—CHARLES STROTHER
Director of Speech Clinic, University of Iowa

9:30 A. M. "The Auditory Factor in Cleft Palate Cases,"
FRANCES PERLOWSKI GAINES
Director of Speech Clinic, Rush Medical College

9:45 A. M. "A Qualitative Study of the Organic Speech Mechanism Abnormalities Associated with Cleft Palate".....DOROTHY OLIVER
Assistant in Charge of Articulatory and Voice Cases, The Speech Clinic, University of Minnesota

10:00 A. M. "A Study of the Respiration of Thirteen Spastic Paralysis Cases during Silence and Speech,"
HENRIETTA C. HULL
Teaching Assistant, University of Minnesota

10:10 A. M. "Dysarthria and Its Treatment," SAMUEL D. ROBBINS
Professor of Psychology, Emerson College

10:25 A. M. Forum

10:40 A. M. "Aphasia and Agnosia in Mental Defectives,"
AUGUSTA JELLINEK
Central Institute for the Deaf

10:55 to 11:10 A. M. "A Program of Physical Education for Speech Handicapped Children" (Motion Pictures),
WILLIAM BILTO
Research Assistant, Speech Clinic, University of Michigan

FRIDAY AFTERNOON, DECEMBER 29

1:30 O'CLOCK

Joint Meeting with The National Association of Teachers of Speech

Chairman—HERBERT KOEPP-BAKER
Director of Speech Clinic, The Pennsylvania State College

1:30 P. M. "The Anatomy and Physiology of the Tongue (Slides, Motion Pictures).....MAX A. GOLDSTEIN
Director, Central Institute for the Deaf

2:15 P. M. "Speech Therapy".....EMIL FROESCHELS
(Formerly of the University of Vienna);
Research Professor at the Central Institute for the Deaf

2:45 to 3:15 P. M. "The Need for Stuttering,"
LEE EDWARD TRAVIS
Director of Psychological Clinic, University of Southern California

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FRIDAY EVENING

7:30 Group Conference with Count Alfred Korzybski—Institute of General Semantics, 1234 East 56th St., Chicago, Illinois

A STUDY OF THE PREDICTED DURATION OF THE STUTTERERS BLOCKS AS RELATED TO THEIR ACTUAL DURATION

C. VAN RIPER, Ph.D.
Western State Teachers College, Michigan
AND
ROBERT L. MILISEN, Ph.D.
Indiana University

Although investigations of the role of fear or anticipation of a stuttering block would seem to provide the means for important contributions to our knowledge of the disorder, there are few such studies to be found in the literature. This condition is in marked contrast to the host of theoretical and clinical postulations concerning fear as an etiological and precipitating factor in stuttering. We feel, therefore, that the following brief review of significant experimental studies is appropriate. Only those studies in which the procedure concerned the anticipation period prior to speech attempt are mentioned.

Fletcher (1) found that breathing disturbances, and changes in pulse rate, vaso-constriction and electro-dermal response accompanied the expectation of stuttering prior to speech attempt. He also observed, though no actual correlations were established, that the amount of change seemed proportional to the severity of stuttering. Robbins (2) in a plethysmographic study of stutterers during the shock and stammering demonstrated that although marked individual differences existed as to amount, the fear of stammering (prior to real or imagined speech attempt) produced vaso-constriction in the periphery of the same nature as occurred during actual stuttering. In another study (3) the same author found that increases in the brain volume and pulse of a trephined stutterer were nearly as great during fear of stammering as during actual block. Although Froeschel's (4) survey of the German literature on stuttering is discouragingly lacking in experimental findings he does mention Flatau's observation of neck rigidity prior to and accompanying a speech attempt which resulted in block. Fossler (5) in a careful study of breathing movements during continued stuttering, provided examples of breathing disturbances prior to speech attempts which resulted in stuttering. V. Travis (6) in her study of horizontal (left-right) disintegrations of breathing commented on records that showed anomalies occurring during the period just prior to the overt stuttering spasm. Van Riper (7) in his study of breathing disturbances during expectancy and occurrence of speech block, found

that anticipation of stuttering was characterized by high inspiration-expiration duration ratios, by increased variability, and by the appearance of marked and characteristic breathing abnormalities which at times were duplicated during the overt spasm. Although the correlations (r .13 ± .04) between inspiration-expiration ratios and the durations of the overt spasms was very low when all spasms were analyzed, it was found that the longest and shortest spasms could be clearly differentiated by means of their inspiration-expiration ratios during the period prior to speech attempt. Morley (8) observed, in a study of the eye-voice span of stutterers, that long fixations occurred when words were recognized from past experience as likely to be associated with stuttering. He also found that action current abnormalities of the type described by Travis (9) occasionally occurred just prior to overt block. Similar results were found by Strother (10) in an independent but contemporaneous experiment. Jasper and Murray (11) in a study of eye-movements during oral reading, noted that eye-closings occasionally occurred just prior to the beginnings of clonic spasms.

In addition to the above studies of behavior during the anticipatory period prior to speech block, there exist in the literature a number of recent studies on the influence of certain factors in precipitating or determining the frequency of stuttering blocks. Since these factors exert their influence primarily during and through the anticipation that occurs prior to speech attempt we are summarizing them briefly. Van Riper (12) in a questionnaire study of stuttering symptoms found that, according to stutterer's testimony, devices of avoidance, postponement, initiation, anti-expectancy and disguise were commonly employed by the stutterer prior to speech attempt on a feared word, and that these devices could be responsible for some of the breathing abnormality during the anticipatory period. Johnson and his co-workers (13) in a series of studies, have demonstrated that certain cues existed in oral reading material, the perception of which contributed significantly to the precipitation and frequency of stuttering. These cues were shown to consist of word, letter, content, placement, color, and situation associations with past stuttering.

Milisen (14) has shown that the adult stutterer frequently anticipates stuttering but does not necessarily expect to stutter before each spasm, and that all anticipations of stuttering do not lead to stuttering. Further, (15) he has shown that stutterers anticipate more frequently on the initial word of a sentence than on any following ones, and that in general the amount of anticipation gradually decreases from the first word of the sentence to the fourth. In another study (16) he has shown that the longer the word, the greater the amount of anticipated stuttering.

Van Riper (17) showed that the empathic response to the stuttering of other persons increased the number of stuttering blocks. In another study of the same author it was demonstrated that frequency of stuttering was increased when threat of penalty per stuttering block was given prior to speech attempt in oral reading.

The literature above summarized indicates clearly that certain very important influences and behavior exist during the period prior to the speech attempt on which stuttering occurs. First of all, the frequency of occurrence seems to vary with the presence or absence of certain cues associated with stuttering with the expected penalty, with the mode of communication (see the study of Johnson and Rosen) (13). Secondly, the behavior during the overt spasm, i. e., the type of speech abnormality exhibited, seems to vary according to certain behavior[1] of the speech mechanism during the period just prior to speech attempt. Thirdly, there is some indication[2] that the duration of the overt spasm varies with the inspiration-expiration duration ratio, a measure which has been widely used as an index of emotion, during the period just prior to speech attempt. In view of recent innovations in clinical practice (see Van Riper (19), Johnson (20), and Koepp-Baker (21)) which seek to use the period just prior to speech attempt to reduce the duration and abnormality of the stuttering spasm, it seemed advisable to test the third assumption mentioned above by further experimentation. The problem, as finally formulated, was as follows: Can the stutterer, in the period prior to speech attempt, predict the duration of the overt spasm? The authors decided to carry out their experimentaion independently of each other in order to insure a more adequate answer to the question. The results will, therefore, be described separately.

I. In the experiment by Milisen the procedure was as follows: A Renshaw Polygraph with two standard pens and two contact keys was used as the recording device. A simple exposure box was used to present single words to the subjects. One of the contact keys was worked by the experimenter and this was in circuit not only with the polygraph pen but also with the flash-light bulb in the exposure box that illuminated the stimulus word. The other contact key was worked by the subject and was in circuit with the other polygraph pen.

The stimulus material consisted of fifty or more cards per stutterer bearing one word. These words included the twenty-five most difficult or "jonah" words provided by the subject, together with words chosen from the lists of other stutterers. Fifty or more words were presented one at a time, by means of the exposure box to each stutterer.

The instructions to the stutterer were as follows:

"This key is to be pressed by you as soon as you see a word in that exposure box. If you do not think you will stutter on it, press the key only once; if you think you will stutter but will have only a short spasm, press the key twice. If you think you will have a medium spasm, press the key three times. If you think you will have a long spasm, press the key four times. Do this as soon as you have decided. After you have done this, I will press my key and a light will flash. You are to start the word and press down on your key as soon as you see the flash. Keep the key down until you have said the word. Then release it. (The experimenter did likewise with his key, to provide a second check on duration.) You are to attempt to say the word normally."

[1]See Van Riper, C. (12).
[2]See Van Riper, C. (18).

In explanation of the above instructions, it may be said that instead of asking the subject to estimate spasm durations in seconds, a procedure which would have introduced all of the phenomena of the subjective appreciation of temporal intervals, it was felt advisable to use the four-fold classification of relative durations.

The records thus produced were very similar to those pictured in the article by Van Riper, "A Study of the Thoracic Breathing of Stutterers during Expectancy and Occurrence of Stuttering Spasm," (*Journal of Speech Disorders*, Vol. 1, September, 1936, p. 65.) The sole difference was in the stutterer's method of signaling his expectancy or anticipation. In the present experiment, after seeing the word, he pressed his key one, two, three, or four times according to the length of spasm he felt was approaching.

Forty-three adult stutterers (forty males and three females) ranging in age from 16 to 39 years served as subjects.

TABLE I

DIFFERENTIAL GAINS AND AVERAGES OF COMPARISONS BETWEEN THE FOUR DISTRIBUTIONS OF SPASM DURATION

STUTTERER'S SELF-SCORING (¼ SECONDS)

	NO ANT minus ANT I	NO ANT minus ANT II	NO ANT minus ANT III	ANT I minus ANT II	ANT II minus ANT III
N.....	38.	29.	16.	32.	19.
Ave. gain.....	2.51	5.69	15.7	3.3	10.57
S. D. Dist.....	±3.08	±7.2	±28.16	±4.43	±22.74
S. D. Ave.....	± .05	±1.33	± 7.04	±0.78	± 5.2
C. R.....	5.0	5.4	2.2	4.2	2.04

OBSERVER'S SCORE OF THE STUTTERING SPEECH

N.....	38.	29.	16.	32.	19.
Ave. gain.....	1.85	5.3	17.7	3.15	12.56
S. D. Dist.....	±2.95	±6.78	±32.6	±5.58	±29.0
S. D. Ave.....	±0.48	±1.24	± 8.2	±0.97	± 6.65
C. R.....	3.8	4.3	2.2	3.2	1.9

Results: The results, which are expressed in Table I, are divided into two parts according to the stutterers' estimates of the spasm durations and according to the estimates of the experimenter.

In order to simplify the labelling in Table I, the following abbreviations are used: "NO ANT" refers to words on which the stutterer had no anticipation of blocks; "ANT I" refers to words spoken when a short spasm was anticipated; "ANT II" refers to words spoken when a spasm of medium length was anticipated; "ANT III" refers to words spoken when a long spasm was anticipated.

The duration of time taken by each stutterer to say a word was tabulated in quarter seconds by the polygraph, and two to four distributions were made of each stutterer's results. All results from words on which stuttering was not anticipated (NO ANT) formed one distribution. Words on which (ANT I), (ANT II), and (ANT

III) occurred formed the other three distributions. All stutterers did not present results in all four distributions; therefore some distributions will have fewer cases than others. On the other hand, since the duration of spasms varies greatly from stutterer to stutterer, comparisons were made from one distribution to the other only by using those stutterers who presented results in both the distributions compared. The gain in the average duration of spasms of one distribution over the other was determined and from this distribution of gains was computed the difference and its reliability.

The stutterer's measurement of the duration of his speech attempt was highly consistent with that of the observer since the average gain measured by both was approximately equal and always in the same direction. In general, the average gains shown by the stutterer's measurements were judged to be more reliable than those made by the experimenter. This latter factor was probably due to difficulty in observing the moment when the stutterer had finished saying the word. We, therefore, restate some results from the stutterer's self-measurements.

The average time taken to speak words on which a slight spasm was anticipated was .62 of a second longer than the time taken to speak non-anticipated words.

The time taken to speak words on which a spasm of medium length was anticipated was 1.42 seconds longer than the time taken to speak non-anticipated words.

The time taken to speak words on which a long spasm was anticipated was 3.9 seconds longer than the time taken to speak non-anticipated words.

The time taken to speak words on which a medium length spasm was anticipated was .63 of a second longer than the time taken to speak words on which a slight spasm was anticipated.

The time taken to speak words on which a severe spasm was anticipated was 2.6 seconds longer than the time taken to speak words on which a medium length spasm was anticipated. Critical ratios indicate that there exist statistically significant differences between the actual durations of spasms classified according to predicted duration.

We conclude therefore that stutterers can predict the occurrence and durations of the overt spasm when the prediction is made just prior to speech attempt, and if the prediction is made in terms of relative judgments of no spasm, short spasm, medium spasm, and long spasm.

II. The experimentation, as has been mentioned earlier in the paper, was performed by the authors independently of each other. The results of the other experiment, performed by the senior author at W. S. T. C., Michigan, are now given. The testing procedure used was identical throughout except for the addition of breathing recordings for six of the thirteen cases. This merely served as an additional check on spasm durations, the six stutterers having a form of stuttering which was clearly reflected in breathing abnormality. Another

variation consisted of giving each stutterer enough words to provide twenty records for each of the No ANT, ANT I, ANT II, and ANT III classifications. This experimental control seemed valid since, although certain stutterers gave more than twenty records in certain of the prediction classifications, only the first twenty records were used in the tabulations. It was usually difficult to find stutterers who would have enough ANT III words under the experimental conditions to ensure adequate statistical treatment. One stutterer, for example, was given 421 stimulus words before enough records in each classifications were obtained. Since the number of subjects (13) was inadequate for such individual statistical treatment, as was given to the other data, all the records of all the stutterers were lumped together and the averages and standard deviations were determined for each prediction classification. Since this procedure provided 260 spasm durations in each of the four categories, it was felt that the critical ratios would reliably indicate whether or not stutterers, as a group, could predict the duration of their spasms. The stutterer's duration values were those used in the computations since they agreed most closely with the breathing abnormalities of the six stutterers. The results are expressed in Table II.

TABLE II

	No Ant	Ant I	Ant II	Ant III
Ave. duration	.18	1.05	2.42	4.27
S. D	.24	2.30	3.30	7.10
C. R. (No Ant, Ant I)	4.3	C. R. (Ant I, Ant II)		5.7
C. R. (No Ant, Ant II)	9.0	C. R. (Ant I, Ant II)		9.7
C. R. (No Ant, Ant III)	8.9	C. R. (Ant II, Ant III)		2.4

Average durations in seconds, and standard deviations of overt spasm durations classified according to categories of predicted duration.

The results of this experiment, therefore, indicate that not only do the averages of overt spasm durations increase with the increase in the length of the predicted duration, but that there is no great overlapping between the various classes. Stutterers, therefore, can predict in a general way the duration of their overt spasms.

Discussion: It seems to the authors that these findings are important to clinical practice. Clinicians have noticed for many years that the severity of stuttering varied from word to word and from situation to situation. They have frequently commented on the compulsive nature of the stuttering block. They have employed various devices to distract the stutterer, to remove his attention from the approaching block, to introduce new stimuli into the period just prior to speech attempt. The failure (see Greene (22)) of such devices to produce permanent relief appears to be due to the loss of novelty and the habituating processes that inevitably follow constant use. As the distraction becomes more familiar and more habitual its distractive and attention-compelling value decreases,

thus providing opportunity for the fear of stuttering to return. Thus, although these devices do affect the anticipatory factors which precipitate and perhaps determine the duration of spasm, they have but small or negative value for therapy. There are other techniques however of altering the mal-conditions existing in the period prior to speech attempt. Some of these would no doubt be focussed upon the unconditioning of the cues which precipitate stuttering spasm. Others would seek to remove the anticipated penalty which has been shown to determine in part the frequency of stuttering in the adult stutterer. Still others, and these seem to have remained virtually neglected until recently, will be devoted, not to preventing the occurrence of spasm, but to shortening the duration. The handicap of stuttering is fundamentally due to two features of the overt spasm: the interruption to communication, and the abnormality of speech as expressed through repetition, prolongation, and contortion. If it were possible to stutter with a minimum of interruption and abnormality as seen in the same stutterer and among different stutterers this would tend to indicate that these two factors are susceptible of some control. This experiment demonstrates that certain factors exist in the period just prior to speech attempt which determine the duration of block. It appears therefore that a therapy which is focussed upon those factors might be able to get rid of the handicap by shortening the durations of spasms. Such a therapy would entail the alteration of preparatory sets prior to speech attempt. If a stutterer can predict the duration of his blocks, and if it is possible to change that prediction, the clinician has a new set of techniques and a new approach to the problem of stuttering.

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STUTTERING AS AN EMOTIONAL AND PERSONALITY DISORDER [1, 2, 3]

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A proper understanding and solution of the problem of stuttering is of great importance for science, both pure and applied, especially for psychology and psychopathology.

There are many current controversial conceptions of its nature, causation and management. A critical discussion of them cannot here be given. Their enumeration and discussion has been offered by others (1).

The object of this paper is to present a conception of the origin and development of stuttering based on modern trends in what I believe to be scientific psychology and on clinical findings in stuttering.

Thesis

The thesis of this paper is the following: Stuttering is a specifically conditioned personality, emotive behavior and speech disorder in the struggle for equilibrium during social speaking.

Definitions

Of the words in the title and thesis, all have, I believe, generally accepted meanings except stuttering, personality and emotive behavior.

1. **Stuttering:** As the term stammering is commonly used with several different meanings (lisping, complete speech block or speech hesitation or speech repetition or their combination) the term stuttering is, in my opinion, preferred for any degree of that special disorder of speech characterized by transient interruptions of the rhythm of speech, resulting in speech block, whether incomplete as in hesitation and repetition, or complete as in temporary inability to produce any sound, or their combination.

2. **Personality** is here used for the total organization of the individual's behavior reaction tendencies, with emphasis on the persistent behavior reaction tendencies.

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[1]From the Department of Nervous and Mental Diseases, Northwestern University Medical School.

[2]Elaboration of presidential address given before the Chicago Neurologica Society, January 20, 1938.

[3]By arrangement with the *Illinois Medical Journal*, this article is published simultaneously in the JOURNAL OF SPEECH DISORDERS.

3. **Emotive behavior** or **emotion** is used for behavior under excitement, during which there is overactivity of the total animal organism. Others (2) have referred to excitement or excessive tension as undifferentiated emotion. If preferred, the terms excitement or excessive tension may be used instead of undifferentiated emotion. The undifferentiated emotion of excitement may exist by itself or precede or follow any of the other emotions. When excitement is present, the individual reacts to it in various ways, such as panic, confusion, fear, anger.

Such terms as tension, equilibrium and the like found in the remainder of this discussion, have the usual accepted meanings.

Conception of the Problem of Adjustive Behavior

Stuttering is a type of adjustive behavior.

The study of the why of stuttering is a study in motivational psychology.

Motivation psychology is "the study of all conditions which arouse and regulate the behavior of organisms. The *arousal* of behavior necessarily implies a release of physical energy from the tissues. The *regulation* of behavior includes the control of activity through purposive determinations, as well as the restriction of activity by organic structure." (3).

Hence the scientific study of motivation falls within the field of mechanics, that is, biomechanics, or the energetics of animal activity, including the origin and regulation of behavior.

Thus the problem of adjustment is really one of human energetics.

Types of Activities Within the Human Organism

Although, like all organisms, the human organism acts as a unit, it has several types of activities which may roughly be classified in accordance with their decreasing levels of tension, as follows:

1. Subjective or so-called mental, psychological or psychic activities, including such activities as thinking, feeling, wishing, deciding. They are accompanied by varying degrees of consciousness or awareness, from the most uncritical, reflex, passive or undirected to the most critical, reflective, active or directed.

2. Vocal activities.

3. Postural or gestural activities, also called skeletal, voluntary, projicient, ambulatory, somatic.

4. Visceral activities, also called vegetative, involuntary, autonomic nervous system activities.

5. Physico-chemical activities which are present in all types of bodily activities.

All of these are inter-related and inter-dependent and changes at one level may influence any or all of the others.

The Human Organism and the Adjustment Process

The human organism is an energy system constantly capturing, transforming and transmitting energy (4).

It is in a state of unstable, dynamic moving equilibrium.

Forces or processes arising within it are frequently in conflict with one another and the total human machine is frequently in conflict with external forces or processes.

The result is constant variations in the level of tension with a tendency to disintegration, disequilibrium or disorganization.

This requires constant attempts at resolution, reduction or release of tension and return to integration or equilibrium.

The adjustive process may be regarded as a trap situation with the following steps:

1. A motive or directed energy.
2. Thwarting, blocking or resistance of external or internal origin.
3. A state of tension.
4. Adjustive attempts by varied responses, with trial and error and eventual success.
5. Solution, resolution, release or reduction of tension.

As time goes on, maturation, training and learning take place, with a system of conditioned responses and habits, with gradual extension of the provocative stimuli and varieties of response until well-organized patterns of adjustive behavior are developed.

The condition of equilibrium from moment to moment depends on the momentary total internal situation or condition of the organism and the momentary total external situation or condition of the environment (6).

As in physics, the final momentary behavior is the resultant of the total field of forces and motions (7).

The momentary total internal situation of the human organism depends upon the congenital equipment, stage of maturation, all past experiences and reactions at all levels, and the momentary state of health.

The momentary total external situation includes social (other persons in family, school, neighborhood, church, work, social life) and non-social (temperature, humidity, noise, light, etc.) factors.

Emotion and the Struggle for Equilibrium

As a result of (1) overstimulation or overmotivation, or (2) blocking of any strong motive or impulse, of external or internal origin, there ensues a state of excessive tension or excitement, which is the undifferentiated emotion mentioned above.

The total organism is stirred up from its highest to its lowest level of activity. The whole organism is overactive and disintegration is taking place at its highest level, or, as Janet (8) would put it,

there is a decline of psychological tension. Thus breakdown, disintegration, disequilibrium, disruption or disorganization occurs, probably from decortication or extracortication (9).

Young (10) has well defined an emotion as "a disintegration of behavior under certain conditions of stress—a symptom of imbalance of motivating conditions within the personality."

Such a situation demands immediate action or solution by resolution of tension and re-establishment of integration or equilibrium.

General Application to Speech, Including Stuttering

Speech, especially social speech, is the highest type of integrated response of the total human organism.

Social, interpersonal, communicative speaking is a greater strain than non-social, merely expressive speaking.

In social speaking the individual is really in a trap situation.

The adjustment process in social speaking may be described as follows: The main motives in social speaking are mastery (of thinking and speaking) and social approval. Increased tension may occur from overstimulation, external blocking or internal conflict. There is a struggle for adjustment by varied responses of thinking and speaking, with trial, error and success—spontaneously or by imitation or training.

When, during social speaking, excitement or excessive tension occurs, we have a state of undifferentiated emotion with a feeling of disintegration, disorganization or disequilibrium.

This is a critical or emergency situation demanding immediate action or solution.

There is interruption of a task (that of social speaking) with disorganized attempts at completion with resolution of tension (11). This may terminate in learned maladjustment or persistent non-adjustment.

The main possible types of response are:

1. Nervousness, embarrassment, timidity, or self-consciousness in social speaking situations.
2. Refusal to speak.
3. Strained or strange voice.
4. Stage-fright.
5. Stuttering.

There may be different degrees and qualities of these responses.

In stuttering there is interruption of the rhythm of verbal expression, with manifestations of speech block, either complete with temporary inability to produce any sound, or incomplete with hesitation or repetition of initial sounds, or their combination.

Specific Application to Stuttering

Here we shall consider first the energetics or dynamics of the first and subsequent moments of stuttering.

a) *Energetics of the first or primary moment of stuttering.*—This depends on the momentary total internal and external situations.

The predisposing factors (12) are: (1) an unduly unstable congenital equipment; (2) past experiences, psychological and non-psychological, (illness, injury, etc.) which lead to instability; (3) acquired personality traits, especially shyness and timidity; (4) a low degree of maturation, especially in childhood, particularly before the establishment of correct automatic speech habits; (5) perhaps sex, since it is more common in males, for either biological or/and other reasons; (6) the momentary state of health, psychological and non-psychological, especially fatigue and illness.

The precipitating, exciting or disintegrating factors (13) are: (1) a social speaking situation with (2) overtension or excitement or undifferentiated emotion from any cause or combination of causes which produce overstimulation, external thwarting or internal blocking (conflict). This includes sudden shock or fright, being teased, nagged or ridiculed, fear of being interrupted, being hurried by others in speech, the desire to keep pace with the rapid conversation of others about him, failure of others to listen to what he says or to wait for him to speak, forgetfulness of the words he wishes to say, being forced to speak excessively or to repeat words too difficult for him, any type of child mismanagement; fears of others because of previous mismanagement or of being punished or found out, internal unresolved personal secret mental conflicts with feelings of shame, guilt, embarrassment from any sexual or non-sexual cause, anger, struggle with lisping, bilingualism with language conflict, undue emotional pressure from persistent efforts to force a left-handed child to use the right hand (generally, if not always associated with many other evidences of child mismanagement).

b) *Energetics of subsequent recurrent, secondary moments of stuttering.*—The additional factors to be considered here are: The gradual fixation of stuttering by cumulative emotional conditioning and habit formation, with extension of provocative stimuli and types of response, with persistent recurrence of the maladjustment or non-adjustive response as a line of least resistance. Conviction of social speech inadequacy and failure, with fears of speech block, either generalized for social speech situations, or specifically conditioned to certain speech situations, speech sounds, etc. (14).

A system or pattern of defensive adjustment, subjective and objective, to new social speaking situations and memories of past experience with failure, and fear of repetition, results in the organization of what may be called a special preparatory set for social speaking situations (15).

Gradual personality transformations (16) occur, such as:

1) increasingly pronounced suppression of the personality with introversion, withdrawal and concealment;

2) overcompensation with overassertion, stubbornness, negativism;

3) assumed indifference or neglect—drifting;

4) a common sense attitude with constructive efforts for gradual self-improvement and eventual recovery.

Finally, stuttering becomes a vicious circular non-adjustive reaction. Fear of recurrence of stuttering causes stuttering. Anticipation of stuttering causes fear of stuttering.

Phenomena of Stuttering

As stuttering is an overactive response of the total personality, there are responses at all levels of activity, depending on the stage of maturation of the individual.

a) *Objective phenomena* (17). These are present in varying degree and quality in the first and recurrent moments of stuttering. They include:

1) Activities in the peripheral speech machinery, mainly disruption of co-ordination of the oral, laryngeal and respiratory systems, with terminal speech block, either clonic and incomplete as in hesitation and repetition, or tonic and complete as in failure to produce any sound.

2) Skeletal manifestations, with postural, gestural reactions from head to toes.

3) Visceral and autonomic responses, from tachycardia to secretory and excretory changes.

4) Physicochemical upheaval, peripheral and central, including electroencephalographic manifestations.

b) *Subjective, so-called mental, phenomena.* In the first moment of stuttering there seems to be mainly a state of excitement, (which may be preceded or followed by other emotions). With recurrent moments the final product is very complex as has been shown by Van Riper (18) and is summarized herewith under this subheading.

Generalized expectancy occurs whenever the stutterer confronts a conditioned social speech situation, and is often accompanied by a search for speech difficulty and a rehearsal of planned verbal expression.

Specific expectancy occurs when he attempts a specific word. This gives rise to various expectancy devices, such as:

1. Avoidance (giving up the speech attempt, substituting a different word, etc.).

2. Postponement (pausing, repeating preceding words, etc.).

3. Initiation or using "starters" (a word, sound or phrase such as "well," etc.; a movement just before the word, etc.).

4. Anti-expectancy and disguise, such as using a kind of speech in which no word stands out enough to be feared (a monotone, sing-song speech, etc.); distraction of attention such as by voluntary movements, visualization of words, breathing or vocalization ritual; achieving confidence, as by humorous or aggressive behavior.

5. Preparatory set for release reaction, as given under devices of release immediately to be mentioned.

Finally the speech attempt is made and the so-called primary symptoms of stuttering occur in the form of speech block. Speech block is either complete, with no sound produced, or incomplete, with the initial sound produced and repetition of same with hesitation or inability to advance to the next sound. This may occur with vowels or consonants. There then ensues a struggle to release the speech block. If the individual stopped all further attempts at speaking, there would be no further stuttering. But the stutterer persists in continuing, after stopping first or without stopping at all. In the first instance, he stops temporarily, and immediately follows with retrial, or finishing the rest of the word, or having recourse to avoidance, postponement, initiation and anti-expectancy devices. In the second instance, there are attempts at continuing speech by effortless prolongation, hypertension and timing devices, or recourse to interrupting devices.

Following the whole episode there is a post-spasm reaction, generally a feeling of embarrassment and failure, self-consciousness and confusion, with fear of recurrence, frequently leading to a repetition of stuttering.

Explanation of Speech Puzzles in Stuttering

Stuttering seems to be absent or present in social speaking situations, depending upon the emotional condition and attitude at the moment each individual sound is produced. When inwardly calm, confident and at ease, there is no difficulty. When not so, there is apt to be.

This seems to explain the many puzzles in stuttering, such as those enumerated below and many others.

It is generally agreed that every stutterer has little or no speech difficulty as a rule under certain situations. Such common situations are enumerated below, with attempts to explain them.

1. When singing, especially in concert, when the melody and words are well known to the individual. During singing the stutterer is more apt to be absorbed in the pleasure of the song and live in it and be free from fear of speech block and self-observation, unless his interest wanders from the singing to watching the sounds and words, his speech organs and/or other persons.

2. When whistling. This is a less complex activity than speaking, accompanied by less tension and excitement.

3. When whispering, for the same reasons.

4. When absolutely sure that he is alone. Social speaking is a greater strain than non-social speaking. But let the suspicion arise that someone, actual or imagined, is listening or may accidentally overhear, or even occasionally if he speaks to an imaginary audience, then lack of confidence and fear of oncoming recurrence of speech block may at once bring on stuttering.

5. Usually when speaking in concert with other people, especially if he feels buried in the mass of other individuals and voices and has a complete sense of security from being overheard or detected by others even if he did fail in speech. This ensures assurance and self-forgetfulness.

6. He can usually repeat a word which previously caused difficulty. This is due to a momentary change in emotional attitude.

7. There is no trouble with consonants at the end of a word, because the task of saying the word is done and no longer a problem.

8. Consonants followed by long vowels are usually easier than consonants followed by short vowels, because they are apt to be accompanied by an attitude of more calmness and relaxation.

9. There is generally no stuttering when speaking to animals or those much younger, because those situations permit of less tension, less fear of criticism, and more self-confidence.

10. Its greater frequency in males, between 2 and 10 to 1, as compared with females, at different age periods (19). This has never been satisfactorily explained but it may be due, in addition to possible biological factors, to the more stimulating and exciting activities and conflicts of all sorts which, for various reasons, are usually the lot of males from earliest childhood.

11. Stuttering is uncommonly acquired after 15, and 85 per cent of the cases occur before 8 and the second grade (19). From maturation and learning more self-confidence has been developed.

12. Some children, estimated as about 10 to 15 per cent, spontaneously recover from stuttering before entering school; especially between ages 2 and 4 (19). There are only about one per cent of stutterers in the total school population. By maturation and learning increased stability and confidence, especially in social speaking, have taken place.

13. There is an increase of stuttering after the first grade (19). This is because of increased tension from various causes.

14. Momentary release of speech block may follow the use of voluntary muscular movements of the arm, foot, breathing, etc. This is due to distraction and suggestion.

15. Speech may be better with voluntary concentration on visual, auditory, or kinesthetic images or a new strange (pitch of) voice. This is also due to distraction and suggestion.

When the object of supreme interest is the task and the individual is completely absorbed in his thoughts and their expression in suitable words, calmly, confidently, without excitement or hurry,

without anticipation or fear of speech block in general or in specific emotionally conditioned social speech situations, and without fear of detection by others of his speech difficulty, all is well.

But when speech doubt and uncertainty arise, with anticipation and then fear of speech block in the presence of others, real or imagined, a conflict between stopping and continuing, with disruption, panic and confusion come upon the scene and all is lost. The commotion in the peripheral speech machinery is but an evidence of the central and general commotional state.

Role of Disturbing Mental Conflicts

At the onset, any type of disturbing mental conflict that leads to excitement during social speaking may precipitate the first moment of stuttering. This applies also to the recurrent moments.

Unresolved current mental conflicts, of whatever nature, whether originally causally related to the speech disorder or not, may increase the general instability, the tendency to uncontrolled speech hurry and rush, and hence stuttering. Their resolution is important.

Mental conflicts may, of course, flow out of the conditioned emotional attitudes toward bugaboo sounds, syllables, words, situations and persons. They may be an offshoot of the handicapping personality transformations which are an end-product.

The memory of the original exciting cause or causes, if the stutterer ever knew it or them clearly or at all (and he frequently, if not generally never did), responsible for the first moment of stuttering may, for all practical purposes, be entirely extinguished, perhaps never again possible of resurrection, but the conditioned response of speech block and the individual's reaction thereto may recur, centered about the social speaking difficulty. This is not to deny the value of intensive psychological analysis or psychogenetic personality study, with the goal of reducing unresolved emotional conflicts and aiding readjustment.

One of the strongest wishes of the stutterer as he himself will tell you, is to speak normally in social relations and to minimize, overcome, avoid and hide his speech defect from detection by others. The views of Alfred Adler on feelings of inferiority and attempts at compensation, often resulting in overcompensation, are here of value.

Conclusions

Stuttering is a specifically conditioned personality, emotive behavior and speech disorder in the struggle for equilibrium during social speaking. It is a clinical syndrome.

Many factors may be responsible for the state of emotional excitement at the time of the first moment of stuttering and its recurrence.

In each case a careful consideration of all internal and external factors responsible for its onset and continuation is essential—such

as, the physical condition, the routine daily program and habits, the personality makeup and problems, the living conditions and personalities in the home, neighborhood, school and workshop. There should be an impartial search for causes of undue pressure during social speaking.

Its treatment should be that of the total personality and not merely of the speech phenomena. Such proper management should be a combination of physical and mental hygiene, physiotherapy, psychotherapy and environmental therapy adapted to the particular patient, with the goal of readjustment. Especially valuable is intensive personality study and reorganization leading to better peace of mind and social adjustment. Hence the need for psychogenetic personality study.

There are many important problems for research concerning its origin, development, prevention and treatment.

There are many inter-relations with many of the most important problems in psychology, psychopathology, personality maladjustments and disorders.

It can be properly understood only by the application of basic scientific principles.

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(16) This aspect is ably discussed by **Johnson, Wendell,** The Influence of Stuttering on the Personality. University of Iowa Studies in Child Welfare, Vol. V, No. 5, April 1, 1932. Iowa City, Iowa, published by The University of Iowa.

(17) See a) **Travis, Edward Lee,** ref. 1 b and 1 c. b) **Travis, Edward Lee,** and **Knott, John R.,** Bilaterally Recorded Brain Potentials from Normal Speakers and Stutterers. Journal of Speech Disorders, Vol. 2, No. 4, pp. 239–242 (December), 1937. c) **Travis, Edward Lee** and **Malamud, M.,** Brain Potentials from Normal Subjects, Stutterers and Schizophrenic Patients. American Journal of Psychiatry, 93, 929–936 (January), 1937.

(18) See ref. 15.

(19) a) Ref. 1 b and 1 c. b) **West, Robert, Kennedy, Lou** and **Carr, Anna,** The Rehabilitation of Speech. New York, Harper & Brothers, 1937. c) **West, Robert,** Disorders of Speech, Reading and Writing, Chapter XIV in Practice of Pediatrics by Various Authors, Edited by Joseph Brennerman, Hagerstown, Maryland. W. F. Prior Company, Inc., 1937. d) White House Conference on Child Health and Protection. Report of the Committee on Special Classes, Special Education. New York, D. Appleton-Century Co., 1931.

AN EFFECTIVE SPEECH PROGRAM

An effective speech program is not restricted to any definite grade or period of the day, but is an integral part of all the activities of the school. In order that the work may be successful educators, principals, supervisors, and teachers must be speech-conscious and must be convinced of the necessity for good speech. They must realize that training for good speech, like training for character and citizenship, cannot be accomplished merely through formal drill, but must indirectly be a part of every activity of the day. Speech exercises should not be limited to drill on isolated sounds or syllables, but should involve situations in which the child uses speech naturally. No amount of drill on a given sound is of value unless the child learns to use that sound correctly when speaking.

The speech improvement program should begin in the kindergarten, and if time is given to this work each day, a high percentage of the minor childhood speech difficulties will be eliminated in the course of the year. In most cases, the earlier a difficulty is detected, the easier it is to correct. In the first three grades the speech work should be presented chiefly as a play activity so that the child's attention is focused, not upon the drill he is receiving, but upon the pleasure he is deriving from the games. In the upper grades and junior high school, direct attention is called to good speech and the elements comprising it, such as clear enunciation, correct formation of sounds, improvement of vocal quality, correct pronunciation, rhythm, and inflection. The emphasis again, is not upon drill on isolated sounds, but upon speech as a natural means of expression and as an artistic medium.

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HANDBOOK OF PHYSIOLOGY AND BIOCHEMISTRY. By W. D. Halliburton and R. J. S. McDowell. Philadelphia: P. Blakiston's Sons and Co., Inc., pp. 973, 1937. $5.50.

This "old standard" physiology text is well adapted to the speech field. Has a chapter on "Speech and Voice." The text material, furthermore, is heavily weighted on the side of neurology in which speech scientists are interested. The chapters on *Respiration* and *Hearing* are excellent.

RELAXATION IN EVERYDAY LIFE. By E. J. Boome and M. A. Richardson. Toronto: S. J. Reginald Saunders, pp. 131, 1939. $1.75.

This book is written for stammerers and tells them how to relax. It is based on Edmund Jacobson's *Progressive Relaxation.*

C. H. V.

THE HARD OF HEARING CHILD IN THE STATE SCHOOL FOR THE DEAF

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Introduction

Within the last ten years the hard of hearing child has received much consideration as an educational problem in our public schools. Surveys have disclosed that one child out of eight has hearing defects. The White House Conference (1931) defined the hard of hearing children as "those who established speech and the ability to understand speech and language and subsequently developed impairment of hearing. These children are sound conscious and have a normal, or almost normal, attitude toward the world of sound in which they live."

The Conference of Executives of American Schools for the Deaf (1937) states that the hard of hearing are "those in whom the sense of hearing, although defective, is functional with or without a hearing aid." Mrs. Poore (Tennessee School for the Deaf) adds: "Any child whose hearing is not normal but who can, through the amount of hearing he has, either with or without the use of a hearing aid, acquire language and knowledge through the avenue of hearing."

Thus the children whom we call hard of hearing develop speech, though perhaps faulty, through imitation. They may drift along in public schools as cases of inattention, behavior problems, or failures. These children may be found by audiometer testing to have a hearing loss of from fifteen per cent to fifty per cent.

We often find the child's speech affected by his hearing loss, the defect being somewhat in proportion to the per cent of loss and the length of time since onset of hearing impairment. This is usually in the form of omitting syllables, dropping word endings, slurring words, substituting one speech element for another, imperfect elements and poor voice quality.

What aids should be given to these children? Of course each child should have medical attention as soon as his hearing loss is discovered to determine the cause, if possible to improve the condition, if not, to retard further loss.

But of equal importance with medical care is educational guidance. How can the hard of hearing child be best aided in social adjustment? How may he be best educated? The hard of hearing child has special educational needs beyond those which the general public school curriculum is prepared to meet. He needs speech reading, training of his limited hearing by auricular work, and speech and voice training.

In some public school systems there are special classes for children with developed language and impaired hearing. Of the one hundred and twenty-two public day schools for the deaf, sixteen are designated as Schools for the Deaf and Hard of Hearing. Doubtless the remainder also are training hard of hearing children in graded classes as well as deaf children. Some school systems do not separate the child with defective hearing from his class of normal hearing children, but give him special lip reading training and speech correction by a visiting teacher.

In recent years the residential schools for the deaf have also been receiving hard of hearing children discovered by general audiometer testing programs. These children are placed in hard of hearing classes where special emphasis is placed on visual training in speech reading, speech correction, voice improvement and auricular training.

In the Oregon State School for the Deaf about one-sixth of the enrollment may be classed as hard of hearing. That is, they have developed speech through ear training, are auditory-minded and receive auricular training, much of their content courses being taught them with the use of classroom hearing aids. The majority of these children were transferred from public schools when their need for special training was discovered.

The Situation

But this year the first year class was found to consist of four deaf children and five hard of hearing children, three of the latter being recommended by public schools. All five are sound conscious and speech minded, four have connected language, the remaining child spoke in single words, with meaning carried by inflection. The child "A" has some slight hearing. He responds to sounds in the classroom and on the playground. A hearing tube may be used to advantage in speech training. But he has not responded to an audiometer test. "A" started daily auricular training in the second semester. "B" and "C" are definitely hard of hearing (40% and 50% average loss). They do not understand speech directed to them in normal pitch unless they are watching the speaker. Quite often when at work, they do not hear their names called. Their speech is quite defective, so much so that the uninitiated cannot understand their conversation.

"D" and "E" have a slighter hearing loss (20% to 30%). They have been sent to the state school because their loss of hearing handicapped them in their respective public school classes. Their language development is normal, their speech somewhat defective but understandable.

So in a state school for the deaf, the teacher faced a beginning class, about fifty per cent hard of hearing. What was to be her program? How should she integrate the teaching of the deaf with the hard of hearing, the non-language group with the language group?

With deaf children in her class too, she could not give the hearing children what they would get in a regular first grade, nor even in a special public school class for the hard of hearing.

But she could give them three R's, not the completely orthodox variety but reading, writing and speech reading, plus a liberal amount of speech training. She could give them the means to adjust themselves to their condition and position in life.

In the beginning they started all their work with the deaf class, but as the hearing group was able due to language comprehension they were allowed to forge ahead in all branches. Their speech reading started with commands and nouns, but after Christmas they were ready for short sentences to be reproduced in their own speech, dictation and picture description.

Their speech work was both instructive and remedial. With the other children they were taught the formation of the speech elements and the vowel and consonant charts. They were also drilled on combinations and the building of words. This general application to speech resulted in improved speech of the entire hard of hearing group. In addition each child was given individual remedial exercises and drills to correct his own speech errors. Special drills on initial and final "t" and "d," r-, k-, g-, initial and final th, and initial and final s and sh were given those who needed them.

This speech study was of definite value in their reading. The habit of seeing the parts of a word in its whole smoothed their reading path, increasing comprehension and pleasure. They started reading the beginning silent reading cards, with their printed captions to be covered and then matched by noun cards. but quickly graduated to the charts bearing twenty unlabeled pictures. On their own initiative they took to reading the speech reading lists on the slate of nouns, commands, numbers and colors. After Christmas they were ready and eager for books of their own, pre-primers and primers to delight their hearts.

Their writing also correlated with their speech work. They learned to write elements, combinations and words in an effortless way, and kept pace with their speech exercises. Their reading vocabulary proved to be a constant incentive to improve their writing skill.

Thus by the end of the year, "D" and "E" have developed suff cient speech reading skill and improved their speech sufficiently to be returned to their public schools. "B" and "C" while progressing most satisfactorily in speech reading, are in need of at least another year of intensive speech training to make habitual the new speech habits they are acquiring. "A" will be best adjusted in a school for the deaf. His slight hearing will be an aid in speech development and acquisition of language. But for practical placement he may be considered as a deaf child.

Conclusion

Eminent authorities in the field of childhood education are of divided opinions as to the best educational placement for the hard of hearing child. Four alternatives are presented:

1. Remaining in his own public school classroom, with special consideration and help from his classroom teacher.

2. Remaining in his own classroom for content subjects with a coaching period two to five times a week by a visiting teacher in speech reading and speech correction, as needed.

3. Placement in a special public school class for the hard of hearing with a trained teacher instructing both the special skills he needs and the regular school curriculum.

4. Placement in a hard of hearing class in a residential school for the deaf under a specially trained teacher following a regular course of study as well as remedial subjects.

Each of the foregoing has its supporters as a sound plan for educating the hard of hearing child. Different cities and states vary as to the opportunities they offer for the education of the auditorily handicapped child.

Thus each child is an individual educational problem. His placement depends on the educational facilities of his city or county, and state, and on the severity of his hearing impairment, the amount of speech involvement, and the type of behavior pattern.

Each one of us concerned with the education of the hard of hearing child is interested in doing all he can for the best possible educational and social adjustment of each child he contacts. May this effort constantly advance on all fronts for the betterment of the American child and the society of which he forms a part.

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THE RELATIONSHIP OF HEARING ACUITY TO STAMMERING

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This paper presents evidence collected, to date, which attempts to determine if hearing acuity is an etiological factor in stammering.

The following cases stimulated the thought of a possible relationship:

Case 1. Age 13. Learned her letters and many unusual words up to four years. Speech and hearing normal until four. At the age of four she had scarlet fever complicated by quinsy on the left side. Following this illness she had difficulty in spelling and in carrying a tune. She also developed stammering. Very often she was punished for being inattentive. At the age of twelve, "A more intelligent and thoughtful teacher fell to my lot. She found that my inattention was due to lack of hearing. This was reported to my parents, and I was immediately put under medical treatment for eustachian tube blocking. After a year's treatment my hearing was normal in my right ear and very good in my left ear. My inability to spell and remember correct pronunication has greatly improved and with that improvement the hesitancy in my speech, which occurred from confusion as to the correct pronunciation, had largely disappeared. When I am awfully tired or under heavy emotional stress there is a tendency for a return of the speech hesitation."

Case 2. Age 14. He had normal speech up to the age of 3½ years. Then he had scarlet fever and acute otitis media. A year later he had measles with otitis media. There was from 40 to 50 decibels loss (2A Audiometer) of hearing in the left ear throughout the entire range. In the right ear there was 120 decibel loss from 128 to 1,024 frequencies and 80 to 90 decibel loss from 1,024 to 8,192 frequencies. He stammered on words beginning with low frequency sounds. The patient was carefully taught how to correctly produce words starting with low frequencies. After several months of careful observation, the patient did not stammer except when he was under unusual stress or when he did not know what he wanted to say.

Case 3. He began to talk when he was about two years old. He was brought in for a speech examination when he was four because he had infantile speech. At this time there was no indication

of a hearing impairment. Shortly after this examination the child contracted chicken pox which was followed by a "bad cold which left the child's ears running." This persisted for about four months. During the time of the otitis, the child began to stammer. He had stammered for two months when he was again brought in for a correction. Speech training and oral stimulation close to his ears was immediately begun and continued for three months after which time there was no longer any stammering and to the spoken and whispered voice the hearing was normal.

A review of the relevant literature was then made. (See appended bibliography.) Since there was no evidence in the literature reviewed relating hearing acuity and stammering, an attempt was made to establish a basis for the assumption postulated.

Two things became apparently necessary. One was to determine the present status of stammerers among the known deaf and hard of hearing in schools for the deaf and hard of hearing, and the other was to determine the hearing acuity of known stammerers not in schools for the deaf and hard of hearing.

National Survey

A national survey of the 209 oral schools for the deaf and hard of hearing in the United States was made during 1936–1937. The following questionnaire was sent:

1. In your experience, have you found any deaf children who stammer?
2. Have you found any stammerers among those with some percentage of hearing? What percentage? What test was used to calibrate the acuity?

Findings.

1. Ninety-five or approximately 45 percent of the schools answered the questionnaire. These schools were scattered over the United States. The population represented by this 45 percent was 74 percent of the total enrollment in the oral schools for the deaf and hard of hearing for that year. This response is therefore considered adequate.

2. There were reported 8 known cases of stammering among the 14,458 cases included in the statistics. Four of these had acquired speech and had stammered before becoming deaf. The other four had no available history.

3. Among those having residual hearing, 34 cases of stammering were reported. The hearing loss in this group varied from 22 percent to 80 percent with 46 percent as the average loss.

Summary.

Two conclusions can be drawn from the survey. One is that stammering among the deaf was negligible, and the other is that where there was usable hearing, there was stammering also.

Clinical Research

In order to determine the hearing acuity of stammerers not classified as hard of hearing or deaf, sixty-two consecutive stammerers were given hearing acuity tests on a 2A Audiometer. Case histories were also taken.

Findings.

1. In each of the 62 cases, or in 100 percent of the cases, a hearing loss was found. The hearing losses for the best ears ranged from 10 to 22 percent.

2. The case histories showed that 58 or 93.5 percent of the cases remembered having had childhood diseases as otitis media, mumps, measles, scarlet fever, diphtheria, whooping cough and others which could be contributing or causative factors of deafness, and that these diseases occurred before the end of the eighth year.

3. All of the cases remembered having stammered before the end of their eighth chronological year.

Summary.

A conclusion to be drawn from the clinical research is that hearing impairment may exist where known stammering exists, even though the loss is not noted by the stammerer. Another conclusion is that childhood diseases during the first eight years caused the hearing impairment. It may also be concluded that stammering usually develops during the first eight years of life.

Discussion

The explanation of why so few hard of hearing stammerers were found in the schools for the deaf and hard of hearing probably lies in the fact that usually only those with a serious hearing impairment are transferred to a special school. Hearing losses are not usually detected until the loss seriously interferes with school progress. This is apparent since the tabulated scores of the heard of hearing children in the schools here surveyed reveal that the least loss for the best ear was 22.4 percent, while the greatest loss for the group of sixty-two stammerers was 22 percent. If routine hearing tests were given, those with hearing losses would be placed in special schools earlier. This would change the present enrollment status.

In an attempt to explain why the deaf did not stammer and the hard of hearing did, it must be remembered that the deaf never had the sensory impression of sound, while the hard of hearing did have, and that that impression very likely was faulty because of lack of correct reception and perception of sound. It may be conjectured that the hard of hearing at one time heard normally and later became hard of hearing, as the histories indicate. Thus they would receive two sensory impressions of speech sounds. On the other hand, the hard of hearing were hard of hearing first and then became less hard of hearing, or were restored to normal hearing. Thus also receiving

two sensory impressions of speech sounds. Progressive deafness, as well as improvement in hearing, is common. Whichever is the case, all explanations envolve a variation in the individuals hearing acuity. In our findings these fluctuations occurred during the first eight chronological years, which means during the period of formative development of speech.

When fluctuations occur in hearing acuity, reception and perception of sound varies. It is not logical to assume that an incorrect sensory impression originating in the inner ear will reach the brain area corrected.

Imitating speech sounds is a motor activity which is the result of sensory stimulation and involves mental and muscular activity. When the perception of a sound varies, the motor speech mechanism for that sound varies, and thus establishes more than one set of responses for the representation of the same sound.

Imitation is not all that is involved in speaking. Association of ideas and meaning is also a part. When one association can be ellicited by more than one response involving the same response mechanism, it seems apparent that a period of mental confusion would precede utterance. Speech is a habit. Until the stammerer can develop the mental direction necessary for the dominating of any incorrect habits of speech, he will remain a stammerer. Any method which will aid in establishing this dominance in choice, is to be recommended.

Since the mind acts by detecting, then comparing, and finally reacting to a given stimulus, the reaction is both volitional and emotional. Since the unity of the organism implies a certain delicately maintained equilibrium involving all constituent factors, satisfactory adjustment to any types of mental confusion is affected by certain alterations in each or all of the particular functions. Hence, the many ramifications into the personality of the stammerer.

The fact that the deaf do not stammer might be very good evidence that hearing is an etiological factor in stammering. There is no deaf person who ever learned speech through the sensation of hearing. He must be taught every element, every combination, every word, and every bit of the language and its use. Neither is there any speech learned by chance. Since every angle of speech development is controlled, all error is controlled. Even when acoustic stimulation is used in the teaching of speech it is controlled for error. A deaf person has only one habit of speech, and that is the one he has carefully been taught.

Learning to speak is not an easy task for the deaf person; he is not free from embarrassment or free from any of the things that might affect the personality of the deaf child. One of the most trying ordeals for the deaf child is to learn to talk and to talk in correct word order. Speech takes years to develop. All of these conditions should increase the deaf person's chances of becoming a stammerer according to the psychological, emotional, personality, and motor theories if they are valid etiological explanations for

stammering. There is no justification to state that the deaf child's emotional, psychological, personality, and motor make-up is different than a normally hearing child. All that is different is his avenue to meaning. When the correct impressions are made over this avenue, he is not a victim of confusion in utterances. Just the reverse is found where hearing acuity changes during development of speech. (See cases 1, 2 and 3.)

Restating the problem: Is the stammerer's speech a motor exhibition of his sensory impression of speech? If it is, the conjecture is that his impression of speech is faulty, because his speech reception functioned, or is functioning inefficiently. Until the stammerer can develop the mental direction necessary for the dominating of an incorrect habit of speech he will remain a stammerer. Any method which will aid in establishing this dominance in choice is to be recommended. It is very improbable that a single method will be found to cure all stammerers. The recommendation here made is a preventative one. It suggests a check of the hearing acuity during early childhood diseases and at the onset of stammering. Thus lack of hearing certain frequencies can be detected and faulty development of speech can be stopped before habits become fixed. Tactual and visual methods should be used as substitutes for hearing when hearing is not usable. Where amplification would aid sensory perception, mechanical hearing aids should be used.

Conclusion

The evidence here presented suggests that loss of hearing acuity during the period of speech formation is a cause of stammering. This paper is not an attempt to determine in toto the cause of stammering, but does recommend because of certain evidence that sensation of hearing be considered in further etiological research on stammering.

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STUDIES IN THE PSYCHOLOGY OF STUTTERING, XV.

Chorus Reading as a Distraction in Stuttering[1]

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The phenomenon of striking reduction in frequency of stuttering, or even its complete elimination, by the use of so-called "distractions" has long interested those familiar with the characteristics of stuttering. Numerous writers mention the fact that various activities serve as distractions in stuttering, but there seems to have been little attempt to account for the fundamental nature of the mechanism.

Fletcher (3, p. 125) refers to the use of distraction with stuttering as follows:

"Placing corks or wedges between the teeth, shrugging the shoulders, tapping with the feet, pinching with the fingers, whistling or counting before speaking, and numerous similar therapeutic expedients . . . seem to owe their efficacy to the fact that they distract the attention of the stutterer from his difficulty and that, in consequence, they afford him a relief from the morbid inhibitions by which his speech is hindered. The stutterer in time accumulates an entanglement of morbid associations about the experience of speaking to other persons that obstructs his thoughts as well as his words. Naturally to draw his mind away from this entanglement will bring at least temporary relief."

C. S. Bluemel (1, p. 86), who bases his theory of stuttering on the concepts of conditioning, refers to distraction and explains it in this way:

"Surprise is often expressed that a stammerer should speak fluently in church when giving the responses and reciting the Lord's Prayer. This fluency, however, is comprehensible. When other persons speak in unison with the stammerer their words furnish the conditioned stimulus for which his speech is the conditioned response. In Pavlov's terminology the reflex is supported or reinforced, hence it proceeds without inhibition."

In other words, the conditioned response (speech) is inhibited and the result is stuttering. Then the extra stimulus (distraction) brings about inhibition of the inhibition, or disinhibition, and the conditioned response (speech) again appears.

[1]This study is part of a Ph.D. thesis directed by Dr. Wendell Johnson at the State University of Iowa as part of a program of studies in the psychology of stuttering.

Johnson and Rosen (6, p. 108) have reported a study on the effect of changes in speech pattern on frequency of stuttering. They report that the greatest reduction in stuttering was occasioned by alteration of the speech pattern in accordance with some imposed and definite rhythm. Such rhythms, among those which they employed, were metronome, arm-swing, sing-song, reading in chorus with another person, and singing. They mention the fact that the term distraction has been used in an extremely loose manner in connection with stuttering, and they conclude that

" . . . it seems most reasonable . . . to assume that variation in distraction . . . in connection with stuttering means essentially variation in the degree to which stuttering is expected, with concomitant variation in the degree to which the stutterer indulges in avoidance reactions. It seems rather obvious that a stutterer, in attempting to execute a prescribed and somewhat unusual alteration in his speech pattern, would find his attention distracted somewhat from the expectation of stuttering. The stimulus value of words and other cues, as such, would necessarily be changed as the stutterer's attention was being engaged by rhythm or rate, pitch or intensity, as such. In Gestalt terms, the field is altered. If, for these reasons, the stutterer less frequently and definitely expects to stutter, he will less frequently and definitely react with hesitation and strain to such expectation, and his speech will, therefore, be more fluent."

Another way of looking at the problem is to consider the three major components in the field of attention in a distraction situation: (1) the distraction itself, (2) speech, and (3) the possibility of stuttering (fear, expectation, etc.). In the ordinary speaking situation, where no distraction is employed, only (2) and (3) are present and (3) has enough potency to interfere with (2). Now if (1) has sufficient potency to displace (3) from the field of attention, and if it can be assumed that (1) and (2) are less inherently incompatible than are (2) and (3), then one would expect the efficiency of (2) to improve. As stated, however, this is based on the assumption that (1) acts as an interference more on (3) than on (2).

Considering the functions of the organism as falling along a continuum ranging from extremely voluntary to highly automatic types of activity (such as walking), it is observable that the farther down the scale (toward automaticity) an activity lies, the more likely it is to be interfered with by attending to it. An example is the case of the centipede who, when asked which foot comes after which, fell into such a state that she could no longer walk at all! Speech, being a highly automatic function of the organism, is disturbed by the stutterer's attending to it and whatever diverts the attention from speech is likely to bring about increased efficiency in speaking. Thus the distraction, which requires a high degree of concentration on itself, should effect a marked reduction in frequency of stuttering. This notion of levels of automaticity of function may also justify the assumption made above, that the distraction will tend to interfere with the possibility of stuttering rather than with the speech itself.

That is, since both the distraction and the fear and expectation of stuttering occupy levels on the continuum which are high as compared with the level at which speech appears, there would probably be a greater tendency for the two which are more nearly on the same level to interfere with each other. As to why the distraction "wins," rather than the possibility of stuttering, that is a matter of the relative potencies of the two.

Several so-called "stuttering schools" employ distraction devices as major therapeutic measures. Their "cures" tend to be short-lived, however, due to the fact that the effect of the distraction wears off after a time. In many instances the distraction activity itself becomes a part of the stuttering pattern of the individual. In the terminology of Gestalt psychology, the effectiveness of a distraction is attributable to the fact that it alters the field, changes the stimulus configuration. Probably the wearing off of the distraction might then be considered due to its becoming part of a now familiar field and thus no longer eliciting a change in response. From the standpoint of conditioning, the distraction as an extra stimulus loses its power to effect disinhibition of the conditioned response. Fletcher (3), in keeping with this theory that stuttering is due to morbidity of social consciousness, attributes the loss of efficacy of distractions to the acquisition of morbid associations with the devices themselves.

An interesting use of rhythmic distraction in a somewhat different connection is seen in the work of Rosett (8) with epileptic patients. He trained them over a long period of time to breathe or to perform simple movements in synchrony with the beats of a metronome. Two patients showed "increase in tolerance for the tetanic state" and several others were similarly treated with varying degrees of success. Korzybski (7, p. 37) comments on this work and offers this explanation of the effect:

"To synchronize our reactions with a metronome we must *adjust* them, keep them under control, and so automatically *delay* the reactions, or accelerate them. In the case of the cortex the delay is of importance, and so the introduction of *delay* by Rosett's method of training under peculiarly difficult conditions brought about the stimulation of the cortex with the above mentioned consequences."

In an effort to investigate the effect of distraction and perhaps to contribute to the understanding of the fundamental nature of this phenomenon, two studies were conducted.[2] The first, which is presented in this article, is concerned with chorus reading as a distraction; the second deals with the distractive effect of various rhythms synchronized with oral reading.

Introduction, Experiment I

It is a commonplace observation among those familiar with the performance of stutterers that a stutterer can read fluently if some one else, even another stutterer, reads with him. This is a striking

[2]The first is presented here; the second will appear in a later issue.

and very puzzling phenomenon, and various questions arise as to what factor or factors could account for it. Is it due to the presence of another person engaged in a similar activity, or must the other person be reading material identical to that which the subject is reading? Is the factor of meaningfulness of the material read by the other person important? Or is it merely the fact that there is noise going on as the subject reads? In an effort to answer these and similar questions, an attempt was made to set up a series of oral reading situations such that there would be a gradation of the elements involved in chorus reading. Analysis of a chorus reading situation revealed that among the factors involved the following seem to be prominent: sound pattern (including variations in pitch, intensity, quality, and time), meaning, personal factor, and the amount of "support." It seemed possible that these factors might be varied in such a way as to determine which of them, or which combination of them, is crucial in making chorus reading operate as an effective distraction.

Procedure and Subjects

It seemed reasonable to assume that if a stutterer could achieve normal speech—or at least much more fluent speech—by having one person read with him, the co-operation of more than one person would probably have an additional "supporting" effect. The co-operating or supporting readers will be termed pacers. Accordingly, for the situation assumed to be easiest for the subject, three persons—one normal speaker and two other stutterers—read with him. Having stutterer-pacers offered an additional way of altering the sound pattern and/or the personal element. The following 14 situations formed the series used in the experiment:

I. Subject reads alone with no experimental distraction operating.

II. Two stutterers and one normal speaker read with subject, the same material being read by all.

III. Two stutterers read same material with subject.

IV. Normal speaker reads same material with subject.

V. One stutterer reads same material with subject.

VI. Two stutterers read a passage different from that being read by subject.

VII. Normal speaker reads a passage different from that being read by subject.

VIII. One stutterer reads a passage different from that being read by subject.

IX. Normal speaker reads nonsense syllables while subject reads a meaningful passage.

X. One stutterer reads nonsense syllables while subject reads a meaningful passage.

XI. Normal speaker phonates "ah" at relatively constant pitch while subject reads a meaningful passage.

XII. Phonograph record of same normal speaker phonating "ah" at approximately same pitch is played while subject reads.

XIII. Unpatterned mechanical noise is made by normal speaker while subject reads. (The noise was produced by running a block of wood around the inside of a large tin wastebasket.)

XIV. Subject reads alone with no experimental distraction operating.

It will be observed that the order is such as not to favor adaptation[3]—that is, since merely the subject's getting accustomed to the reading situation would probably tend to reduce the frequency of stuttering, the series is so arranged that the situations offer less and less "support" for the subject.

Situations II through V are set up so that supposedly there is progressively less support afforded the subject, in terms of the co-operating readers. In situations VI, VII, and VIII there is similar progressive decline in strength of co-operation, together with the removal of the factor of sameness in materials read by the subject and by the co-operating readers. In situations IX and X, there is removed the factor of meaningfulness in the material read by the co-operating readers, there being present still the phonation of various speech sounds by another *person*. In situation XI, the factor of variation in speech sounds is absent, there being left only the phonation of one sound by another person. In situation XII, the personal factor in the accompanying activity is removed by using a phonograph record. In situation XIII, even the factor of phonation of a vocal sound is removed and only the noise factor remains. Finally, in situation XIV, all experimental distraction factors are removed and the subject again reads alone.

The subjects were 18 stutterers from the Speech Clinic at the University of Iowa. There were three female and 15 male subjects who ranged in age from 15 to 33 years, their average age being 23 years and eight months. At one sitting the subject read 14 different 500-word passages under the 14 conditions described above. The audience situation was held constant, there being present at all readings the same normal speaker, two adult stutterers, and the experimenter. During the reading the experimenter marked the words on which the subject stuttered. At all sittings, the subject, the experimenter, the normal speaker, and the stutterer-pacers were seated in a circle facing the center. Throughout all situations in which he was not serving as pacer, the normal speaker checked with the experimenter. In all remaining situations, except the second, one of the stutterer-pacers did the supplementary checking. In all doubtful instances these supplementary observers were consulted and they indicated their judgments by a prearranged sign.

[3]Adaptation is here used in the same sense as in the study by Johnson and Inness (5).

Reliability

The reliability of the experimenter was calculated from a marking on four different days of the stuttered words in the recorded speech of four stutterers. The average per cent of agreement from day to day, in terms of the number of stuttered words marked, was 98.5.

The experimenter served as one of the observers in an experiment on reliability by Tuthill (9), and several measures of the present experimenter's performance as an observer are available from that study. On two different days the observers were asked to mark stuttered words in the recorded speech of several different individuals, including some so-called normal speakers' extemporaneous speech. Counts were made of the number of words marked on each of the two days, of the total number of different words marked at either time, and of the number of words marked on both days. For this observer these counts were, respectively, 73, 66, 85, and 57. The agreement on particular words marked was calculated by dividing the total number of different items marked (on either day) into the number of common items marked on both days. This method of computation showed 70 per cent agreement for this observer. This was the highest measure obtained from the group of 16 trained observers participating in the experiment. The mean for the group was 57 per cent and the range was from 37 per cent to 70 per cent.

Another measure available from the Tuthill study is the correlation between the items marked on the two days.[4] For this observer, $r = .82$. The mean correlation for the group of trained observers was .72, while the range extended from .55 to .82.

The per cent of agreement of this observer, in terms of the number of words marked on the two days, was 91.0. The mean for the group of trained observers was 87.0 per cent, and the percentages ranged from 72.5 to 99.1.

It should be noted that in this reliability experiment the marking was done on the basis of auditory cues only, and also that there was a sample of only two readings.

It is of interest also to know whether the data from the present study are reliable; that is, whether the subjects would tend to perform in essentially the same manner on other occasions. The reliability of the data was computed in terms of the consistency of performance for the various individuals and for the entire group.[5] The Pearson r for odd-even 50 word sections, for the total group, was .91. After the application of the Spearman-Brown Prophecy formula, in order to correct for attenuation and get a measure of the reliability of the entire data, the reliability coefficient was .95.

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[4] The formula used is $r = V\frac{c}{xy}$ where c indicates the number of common items, and the number of items marked on each of the two days is indicated by x and y, respectively. (This formula is equivalent to that on p. 364 in *Psychometric Methods* by J. P. Guilford.)

[5] A complete table of individual correlations is included in the appendix of the manuscript copy of this study which is on file in the library of the University of Iowa.

Results

Basic data regarding the number of blocks in each situation, giving measures of central tendency and variability for the group, are shown in Table I. The data for the situation designated as "normal" were obtained by averaging the number of stuttered words of each subject in each of the two control situations (I and XIV), the assumption being that the average of the two would probably more closely approximate a record of the individual's performance under normal, or non-experimental, conditions than would either single control situation. It is noticeable that in the four situations in which the same material was being read with the subject, (II through V) stuttering was so strikingly reduced as to be almost eliminated. However, in situation VI, when the subject read material different from that being read by the others, there was a marked breaking down of the performance as shown by the great increase in number of stuttered words. In all subsequent situations there is even greater frequency of stuttering, but in all of the distraction situations there is a considerable reduction in the incidence of stuttered words from the performance in either control situation.

This reduction in the frequency of stuttering may be stated in terms of the per cent of decrease from the normal. Table II shows the mean and median percentages of decrease in the 12 distraction situations, as well as the standard deviations. There appears to be a tendency, for the group, toward a very sharp decline in per cent of decrease on situation VI with a gradual dropping off down to situation X, after which a slight increase is observable. In 21 instances out of the 216 tabulations in the per cent of decrease table[6] (12 percentages for each of the 18 subjects) the effect was that of an increase over the normal percentage rather than a decrease.

Correlations of the normal number of blocks with that in each distraction situation were computed in order to determine whether the subjects tended to maintain the same relative positions in the group, with regard to frequency of stuttering, throughout all situations. The Pearson r's, calculated directly from the data on number of blocks, are shown in Table III. There appears to be a fair amount of consistency except in the first four distraction situations in which stuttering was practically eliminated and for which, therefore, there is an extremely restricted range of values. For a sample of 18 cases an r has to exceed .59 to be significant at the one per cent level or .47 to be significant at the five per cent level.[7] It will be seen from the table that for all except the first four distraction situations and situation VII the correlations are significant at the one per cent level, while the r for situation VII meets the requirement for significance at the five per cent level.

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[6]The complete per cent of decrease table is included in the appendix of the manuscript copy of this study which is on file in the library of the University of Iowa.

[7]See Table V. A. on p. 212 in the sixth edition (1936) of *Statistical Methods for Research Workers* by R. A. Fisher.

TABLE I

THE MEAN AND MEDIAN NUMBER OF STUTTERED WORDS, THE S. D., AND THE RANGE FOR EACH OF THE SITUATIONS FOP ALL 18 SUBJECTS

		Distraction Situations												Control	
	Normal	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	I	XIV
A. M.	104.8	1.4	2.2	3.7	3.8	46.3	53.6	66.1	64.4	80.1	66.6	66.9	54.8	122.7	86.4
Mdn.	99.5	0.0	1.0	1.5	2.0	42.5	46.0	58.0	55.5	54.0	48.0	52.5	44.0	112.5	73.0
S. D.	68.0	3.3	4.0	4.8	4.9	34.2	40.4	49.0	43.7	63.3	64.5	55.9	48.1	81.5	66.8
Range	13—	0—	0—	0—	0—	4—	5—	5—	6—	4—	4—	3—	3—	17—	6—
	245	14	17	19	17	128	150	174	152	227	222	187	187	277	214

TABLE II

THE MEAN AND MEDIAN PERCENTAGES OF DECREASE FROM THE NORMAL PERCENTAGE OF STUTTERED WORDS, TOGETHER WITH THE S. D., FOR EACH OF THE 12 EXPERIMENTAL SITUATIONS FOR ALL 18 SUBJECTS

	Distraction Situations											
	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
A. M.	97.8	95.1	92.7	90.7	51.4	37.8	30.5	28.6	20.4	37.6	38.3	48.8
Mdn.	100.0	99.5	98.2	97.9	50.9	43.1	26.5	21.7	11.3	45.8	33.8	58.9
S. D.	5.6	12.0	12.2	22.3	22.3	42.5	35.8	35.1	32.7	33.5	30.4	26.5

TABLE III

CORRELATIONS OF THE NORMAL NUMBER OF STUTTERED WORDS WITH THE NUMBER IN EACH DISTRACTION SITUATION

	Distraction Situations											
	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
r with normal	.15	.06	—.02	—.17	.63	.49	.72	.65	.74	.68	.74	.68

It is of interest to determine whether there is any adaptation effect between the two control situations. That is, merely the subject's becoming accustomed to the reading situation sometimes results in a reduction in the percentage of stuttering later in the reading period. The percentage of adaptation—that is, the per cent of decrease in stuttering from situation I to situation XIV—was calculated for each subject and for the total group. For the group as a whole, there was an adaptation effect of 29.6 per cent.[8] Only three of the 18 subjects failed to show an adaptation effect. Two of these exhibited an opposite tendency—increase rather than decrease—and the third had exactly the same number of blocks on both control passages.[9]

A graphical representation of the performance of the group in the various situations is shown in Fig. 1, the range, the first and third quartiles, and the mean and median ranks of difficulty being indicated. The 14 situations were ranked for each individual from "most difficult" (with a rank of 1.0) to "easiest" (with a rank of 14.0), in terms of the number of blocks on each situation—the highest number of blocks being taken to indicate the situation most difficult for the subject. The tendency is seen to be that noted earlier with reference to the mean and median number of blocks on each situation; namely, a marked decrease in difficulty on situations II through V (indicated by sharp rise in curve), with increasing difficulty from situations V through X, followed by a somewhat irregular decrease in difficulty.

In order to discover whether the differences in performance on the various situations were indicative of real differences, the t-test of significance was applied. Table IV summarizes these results, the mean percentages being indicated in the top row, the differences among the various pairs of those means in the lower left half of the table, and the t-values corresponding to those differences in the upper half of the table. Since the number of subjects in the study is 18, the number of degrees of freedom is 17, there being (n-1) degrees of freedom with such data. The corresponding t-value at the one per cent level is 2.898. Of the 78 t-values in the table there are 47 which are as high or higher than that required in this case for statistical significance at the one per cent level. Five others are significant at the two per cent level since they are above 2.567, the value required for that level of significance. Interpreting the mean differences in the light of their corresponding t-values, it appears that, for the group:

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[8]This is to be compared with the adaptation figures published by Johnson and Inness (5). They found that for 41 stutterers there was a total adaptation of 48 per cent between the first and fifth readings of the same passage. For a group of 31 stutterers they found that between the first and fifth 180-word segments of a 900-word passage there was a total adaptation of 18.9 per cent.

[9]The complete percentage of adaptation table is included in the manuscript copy of this study which is on file in the library of the University of Iowa.

TABLE IV

THE MEAN PERCENTAGE OF STUTTERED WORDS IN EACH SITUATION FOR ALL 18 SUBJECTS; THE DIFFERENCES AMONG THE MEANS, AND THE t-VALUES FOR THESE DIFFERENCES

	Normal	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
Mean %.....	20.9	0.3	0.4	0.7	0.8	9.3	10.7	13.2	12.9	16.0	13.3	13.4	10.9
Normal.....		6.28	6.19	6.10	6.00	4.43	3.54	3.52	3.19	2.12	3.03	3.11	4.08
II.....	20.6		1.25	3.08	2.68	5.59	5.62	6.26	6.12	5.20	4.28	4.91	4.57
III.....	20.5	0.1		2.50	2.22	5.49	5.60	5.52	6.10	5.18	4.27	4.89	4.53
IV.....	20.2	0.4	0.3		0.53	5.41	5.49	5.41	5.98	5.07	4.17	4.79	4.40
V.....	20.1	0.5	0.4	0.1		5.09	5.24	5.28	5.79	4.97	4.06	4.65	4.26
VI.....	11.6	9.0	8.9	8.6	8.5		2.09	3.39	3.13	2.88	1.63	2.44	1.02
VII.....	10.2	10.4	10.3	10.0	9.9	1.4		2.23	2.22	2.26	1.08	1.86	0.15
VIII.....	7.7	12.9	12.8	12.5	12.4	3.9	2.5		0.24	1.24	0.04	0.16	1.80
IX.....	8.0	12.6	12.5	12.2	12.1	3.6	2.2	0.3		3.07	0.24	0.56	1.87
X.....	4.9	15.7	15.6	15.3	15.2	6.7	5.3	2.8	3.1		2.60	1.87	2.70
XI.....	7.6	13.0	12.9	12.6	12.5	4.0	2.6	0.1	0.4	2.7		0.07	1.22
XII.....	7.5	13.1	13.0	12.7	12.6	4.1	2.7	0.2	0.5	2.6	0.1		2.60
XIII.....	10 0	10.6	10.5	10.2	10.1	1.6	0.2	2.3	2.0	5.1	2.4	2.5	

t-values required for significance: at the one per cent level, 2.898; at the two per cent level, 2.567; at the five per cent level, 2.110.

(1) All of the distraction situations except X (one stutterer reading nonsense syllables) were effective—that is, they effected a significant reduction from the normal frequency of stuttering.

(2) All four of the situations involving the reading of the same material as that being read by the subject (II, III, IV, V) were significantly more effective than any other of the distraction situations.

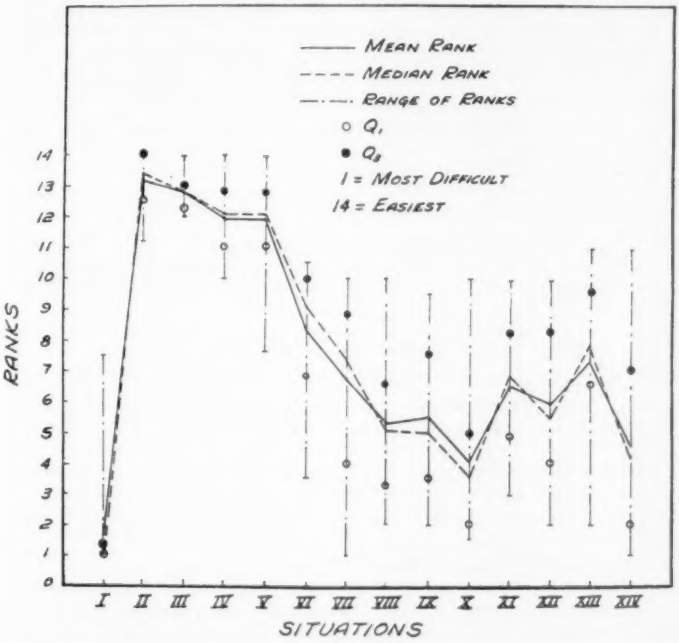

FIG. 1. The Mean, Median, Range, and First and Third Quartiles of the Ranks of Difficulty of the Various Situations, in Terms of the Frequency of Stuttering, for all 18 Subjects.

(3) The distraction in situation VI (two stutterers reading material different from that being read by the subject) is significantly more effective than the distractions employed in either situation VIII or situation IX (one stutterer reading material different from that which the subject is reading, and one normal speaker reading nonsense syllables).

(4) A normal speaker reading nonsense syllables (situation IX) has

significantly more distractive value than a stutterer reading nonsense syllables (situation X).

(5) The co-operation of two stutterers and one normal speaker in reading a passage with the subject (situation II) is significantly more effective in reducing the frequency of stuttering than is the co-operation of only the normal speaker (situation IV).

(6) The co-operation of two stutterer-pacers and a normal speaker (situation II) tends to have significantly more distractive effect than does the co-operation of one stutterer-pacer (situation V) reading the same passage as that being read by the subject—as shown by the fact that the t-value for the difference between the means of these situations is significant at the two per cent level.

(7) The distraction in situation X (one stutterer reading nonsense syllables while the subject reads) seems to be significantly less effective than the distractive factors employed in situations VI, XI, and XIII (two stutterer-pacers reading material different from that being read by the subject, the normal speaker reading nonsense syllables, and unpatterned mechanical noise).

(8) There is a tendency for unpatterned mechanical noise (situation XIII) to be more effective as a distraction than the playing of a phonograph record of the normal speaker phonating "ah" (situation XII).

Summary and Conclusions

The problem was to make a study of the operation of chorus reading as a distraction in stuttering. An effort was made to arrange a series of oral reading situations, involving various combinations of the factors in chorus reading, in such a way as to ascertain which factor or combination of factors is crucial in determining its effectiveness as a distraction. At one sitting, each of 18 subjects read 14 different 500-word passages under conditions including two control and 12 distraction situations. The results are summarized in the section immediately preceding this.

The results of this study offer conclusive evidence that stuttering is not a phonetic disturbance. Phonetically, the passages read in the four situations in which stuttering was almost eliminated are presumably as "difficult" as are the passages on which stuttering occurred with much greater frequency, since the materials used were edited to make them as nearly similar as possible with respect to reading difficulty. This indicates that the stutterer does know how to speak and is able to do so under certain circumstances. It shows that the difficulty is not due to an inability to produce certain sounds fluently, as some stutterers believe.

Chorus reading tends to be more effective in decreasing the frequency of stuttering when the stutterer receives the more "support"—that is, when there are several persons reading along with him—and when the material read by the co-operating readers is the same as that read by the subject.

It is interesting to note that the point at which there occurred the most marked breaking down of the distraction came when there was a transition from reading in unison with the co-operating readers to the reading of different material. It would appear from this and from the performance in the remaining situations that the stutterer tends to speak most fluently when his performance is not easily differentiated from the total activity at the moment. It seems likely that so long as he knows that the whole activity will go on, he does not place so high an evaluation on his own part in it—and, in consequence, tends to perform more efficiently. When the co-operating readers start reading different material, it devolves upon him to speak well, for his inadequacy would then become conspicuous. The more important it becomes for him to speak well, the more likely he is to stutter. In other words, the more positively he evaluates fluency, the more he resists non-fluency—and in consequence, the more he stutters.

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BOOK REVIEW

THE TEACHING OF SPEECH. By G. S. Haycock. Washington: The Volta Bureau, pp. 302, 1937. $2.00.

"The Teaching of Speech" in this case refers to the demutization of the deaf. Divided into three sections: *Natural Speech,* "How best to promote the quality of naturalness in the speech of the deaf;" *Speech Sounds,* "Their classification, production and development: common faults and their correction;" and *Intelligible Speech,* "How to obtain and maintain intelligibility of speech throughout a school."

C. H. V.

ANNUAL CONVENTION

of the

American Speech Correction Association

Chicago, December 27, 28, 29, 1939
Headquarters: Hotel Stevens

(See Program, pages 335 to 338 herein. Bring it with you)

REDUCED RAILROAD FARES

Purchase from your local ticket agent reduced round trip tickets to Chicago. The price per mile varies this year with the distance.

Round trip coach fares from many parts of the country start at 2¼ cents per mile each way for the first 100 miles and diminish in 50-mile blocks to 1.7 cents per mile for distances over 900 miles.

Your attention is called to the fact that, for the first time, both one-way and round-trip first-class railroad fares in upper berths are 10% less than those in lower berths; and that the price of upper berths themselves has been reduced 10% one-way and from 10% to 19% on round trips, depending upon distance.

Round-trip first-class railroad fares in upper berths start at 2.7 cents per mile each way for the first 50 miles and diminish in 50-mile blocks to 2.43 cents per mile for distances over 900 miles.

HOTEL ACCOMMODATIONS

Stevens Hotel—Single room with bath, $3.00 and up.

Auditorium Hotel—Single room without bath, $1.50 and $2.00.
Double room without bath, $3.00.
Single room with bath, $2.50 and up.
Double room with bath, $4.00 to $7.00.

Harrison Hotel — Single room with bath, $2.00 to $3.00.
Double room with bath, $3.00 to $5.00.

Congress Hotel — Single room without bath, $2.50.
Single room with bath, $3.00 to $6.00.
Double room with bath, $5.00 to $8.00.

POSTAL BALLOT ON PLACE OF OUR 1941 CONVENTION

Members who do not expect to attend the 1940 convention are urged to write the Secretary at once whether they favor meeting next year with the N.A.T.S. in Washington, D. C., or in a more central location, such as Chicago. Your vote will be considered when the place of meeting is determined at the forthcoming convention.